VOLUME XXXVIII NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JULY, 1920

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purpose for which it was founded thirty-two years ago, the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage, and be addressed: Editor, National Geographic Magazine, 16th and M Streets, Washington, D. C.

Important contributions to geographic science are constantly being made through expeditions financed by funds set aside from the Society's income. For example, immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. So important was the completion of this work considered that four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures, evidently formed by nature as a huge safety-valve for erupting Katmai. By proclamation of the President of the United States, this area has been created a National Monument. The Society organized and supported a large party, which made a three-year study of Alaskan glacial fields, the most remarkable in existence. At an expense of over $50,000 it has sent a notable series of expeditions into Peru to investigate the traces of the Inca race. The discoveries of these expeditions form a large share of the world's knowledge of a civilization which was waning when Pizarro first set foot in Peru. Trained geologists were sent to Mt. Pelee, La Soufriere, and Messina following the eruptions and earthquakes. The Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole April 6, 1909. Not long ago the Society granted $20,000 to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

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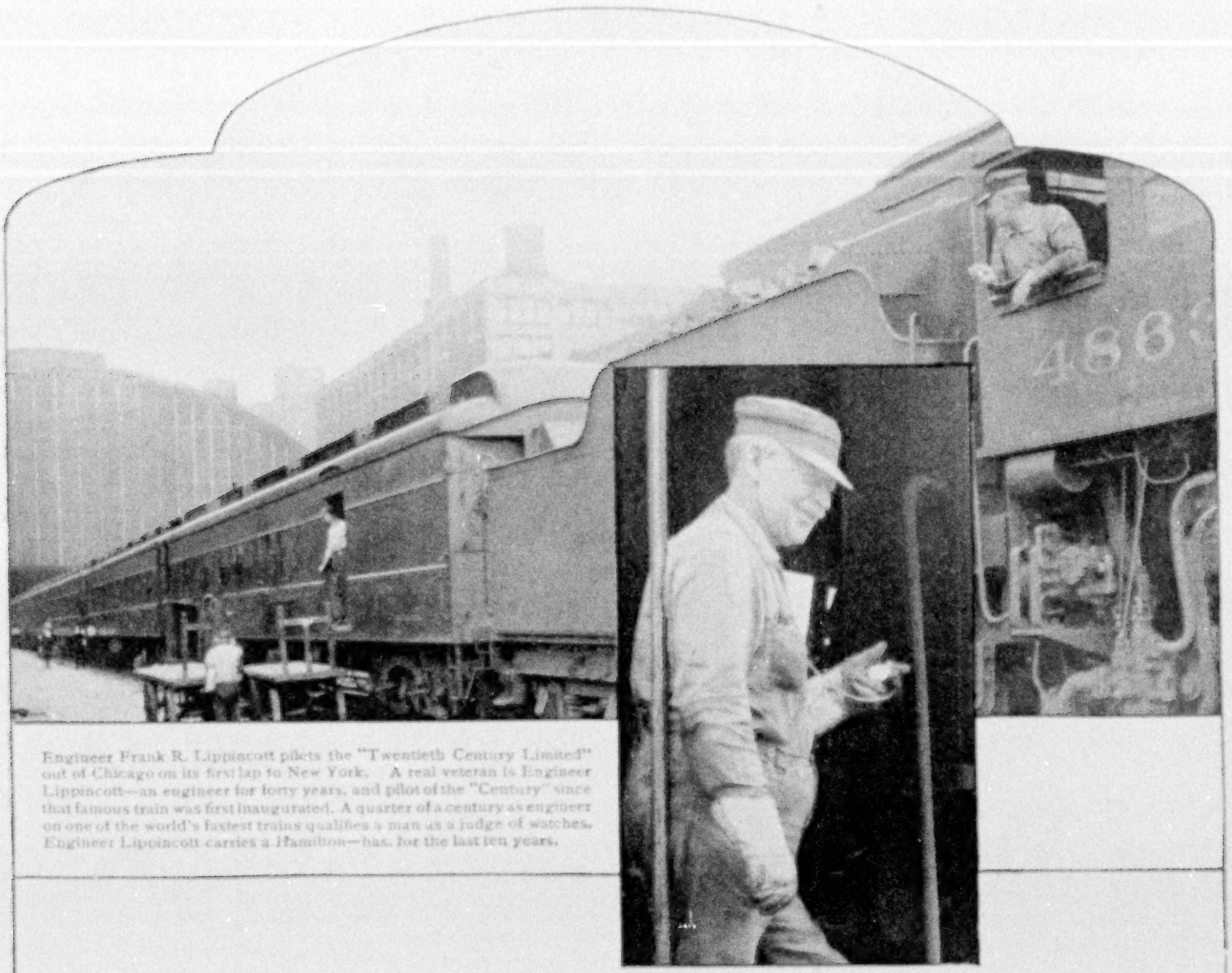


Engineer Frank R. Lippincott pilots the "Twentieth Century Limited" out of Chicago on its first lap to New York. A real veteran is Engineer Lippincott—an engineer for forty years, and pilot of the "Century" since that famous train was first inaugurated. A quarter of a century as engineer on one of the world's fastest trains qualifies a man as a judge of watches. Engineer Lippincott carries a Hamilton—has, for the last ten years.

Hamilton Watch

"The Watch of Railroad Accuracy"

A Railroad Watch, Like the Air-Brake, Must be Unfailing

Railroads are run on watch time, and it's not exaggerating to say that present-day railway service depends as much on accurate watches as it does on air-brakes and semaphore signals. Railroad men *must* have reliable and accurate watches.

The Hamilton Watch has become the most popular watch among railroad men because it is truly dependable. Every Hamilton is made right and with care stays right throughout its long life.

Why shouldn't *you* have a Hamilton? It would cost you no more. The same painstaking workmanship that builds accuracy into a watch also gives it extra years of service. Besides, there's the satisfaction and the convenience of having reliable instead of approximate time.

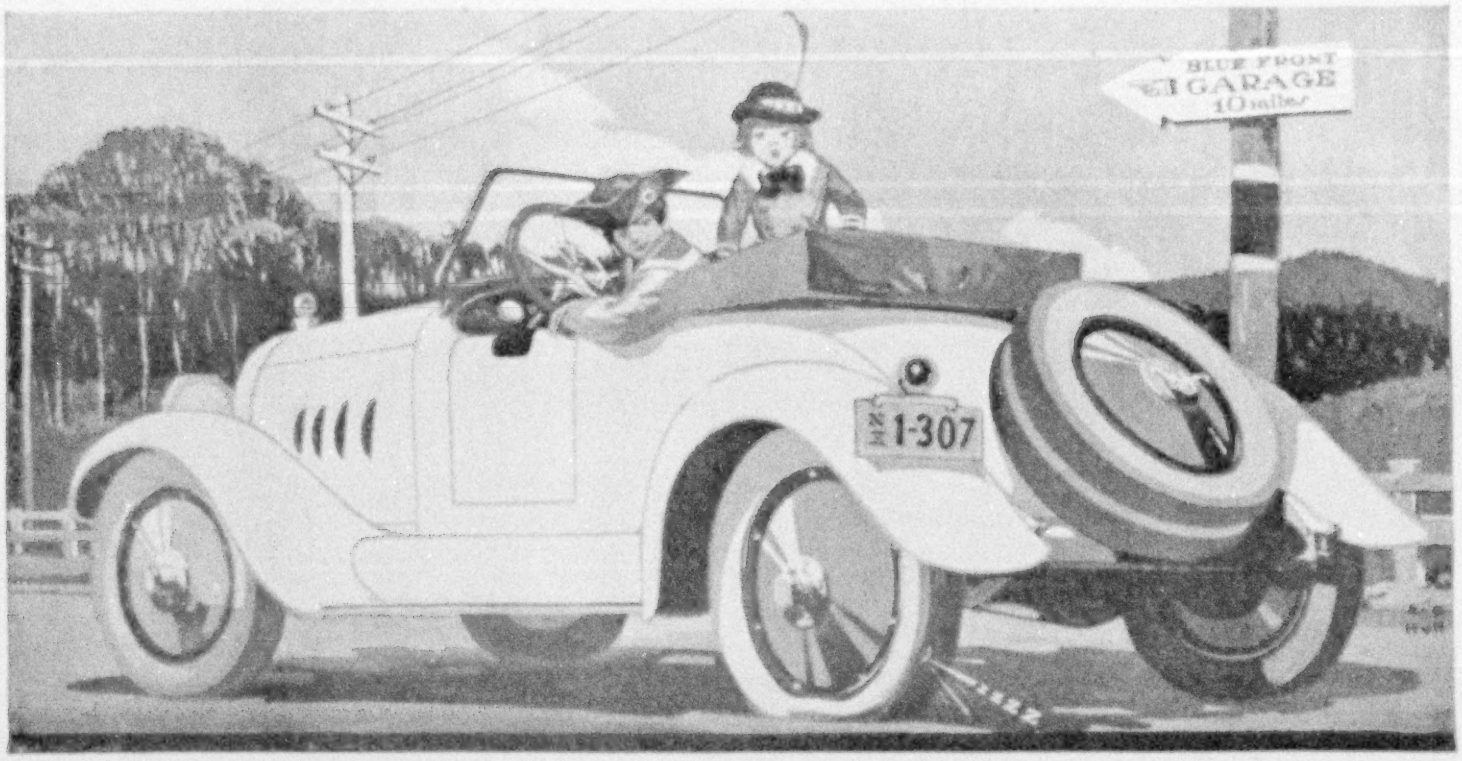
The Hamilton Watch makes an ideal gift—a subtle compliment, a splendid reward, a lasting token of regard. On any occasion when a gift is to be made, a Hamilton Watch would be fitting and appropriate.

From sturdy railroad types to ladies' exquisite bracelet models, there is every desirable kind of watch in the Hamilton line.

Your jeweler will be glad to show you some of them at any time. Prices range from $40 to $200. Movements alone, $22 (in Canada $25.50) and up.

Send for "The Timekeeper"—an interesting booklet about the manufacture and care of fine watches. The different Hamiltons are illustrated and prices given.

HAMILTON WATCH COMPANY - - - - *Lancaster, Penna.*



"Pollyanna" with a flat tire

—There's a good reason for her Cheerfulness

Her car is equipped with a

Weed Chain-Jack

To operate a Weed Chain-Jack, it is not necessary to get down in a cramped, strained position and grovel in mud, grease or dust under a car and work a "handle" that is apt to fly up with unpleasant results. ***To lift a car*** with the Weed Chain-Jack, simply give a few easy pulls on its endless chain while you stand erect—clear from springs, tire carriers and other projections. ***To lower a car,*** pull the chain in opposite direction. ***Up or down—there's no labor.***

Never gets out of order. Quickly adjusted to any required height by lifting the screw and spinning the corrugated "collar" shown in the illustration. ***Try it yourself***—you will never be satisfied with any other jack.

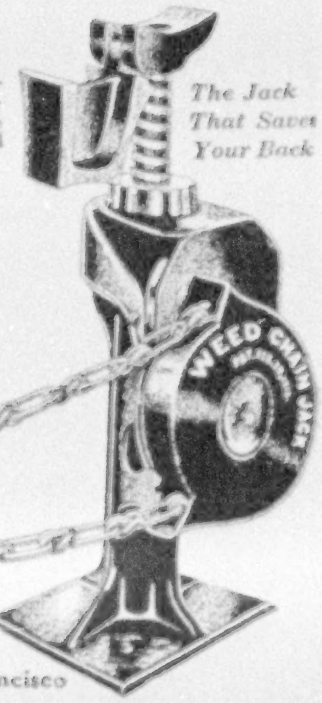
10 Days' Trial

If your dealer does not have them, send $7.50 for any size pleasure cars or $15 for the Truck size, and we will send you one, all charges prepaid. For delivery in Canada send $8.50 for any size for pleasure cars or $16 for the Truck size. Try it 10 days. If not satisfied return it to us and we will refund your money.

MADE IN FOUR SIZES

SIZE	Height When Lowered	Height When Raised	Height When Raised With Aux. Step Up	Price
8 inch	8 inches	12 1-2 inches	14 1-2 inches	$7.50
10 inch	10 inches	16 3-8 inches	17 3-8 inches	7.50
12 inch	12 inches	18 1-2 inches	No Aux. Step	7.50
12 in. Truck	12 inches	19 1-2 inches	No Aux. Step	15.00

The 8-inchand 10-inch sizes are made with an auxiliary step as illustrated. When in operative position this step adds two inches to the height of the jack.



The Jack That Saves Your Back

AMERICAN CHAIN COMPANY, Inc.

BRIDGEPORT CONNECTICUT

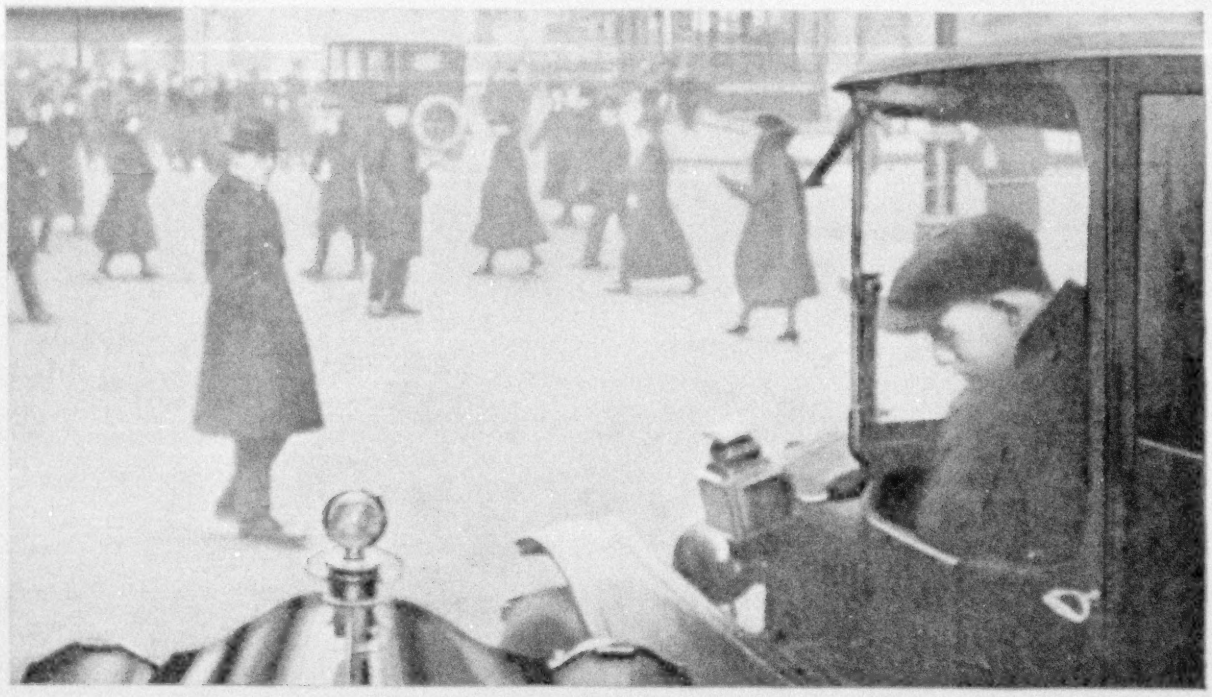
In Canada: Dominion Chain Company, Limited
Niagara Falls, Ont.

Largest Chain Manufacturers in the World

The Complete Chain Line—All Types, All Sizes, All Finishes—
From Plumbers' Safety Chain to Ships' Anchor Chain

GENERAL SALES OFFICE: Grand Central Terminal, New York City

DISTRICT SALES OFFICES: Boston Chicago Philadelphia Pittsburg Portland, Ore. San Francisco



The "tight-squeeze"—an hourly occurrence on every crossing and on every crowded street, with cars of fifty different makes—more or less under the driver's control

How Can the Motorist Save Himself from the "Other Fellow"

NEW YORK CITY recorded over three thousand motor car collisions last year in Manhattan Island alone.

Effective traffic regulation depends on each *individual driver* having his car under *positive control.*

If every driver could be as *sure* of his car as the Packard owner, there would be less congestion, and only the *careless* driver would get into "accidents."

THE Packard people believe that first-class transportation must deliver Safety, Ability, Comfort, Economy, and Enduring Value to the highest degree.

Choose from the best sources of the commercial parts makers—and your assembled car still will not show these features to the Packard degree.

You will get them only by starting with *unified engineering* in the Packard manner.

Controlling parts by specifications and tests—through casting, forging, machining, heat-treating, finishing and inspection.

Paying 12 cents a pound for your steel, instead of taking a chance with steel at 6 cents.

You will be led straight to the Twin-Six Engine, with its sure and flexible power, and a greater range of ability in high gear than any other engine in the world.

To gears heat-treated through and through—not merely case-hardened.

To clutch, brakes, universal and bearings that give you the safety of positive control—Packard designed for the Packard car.

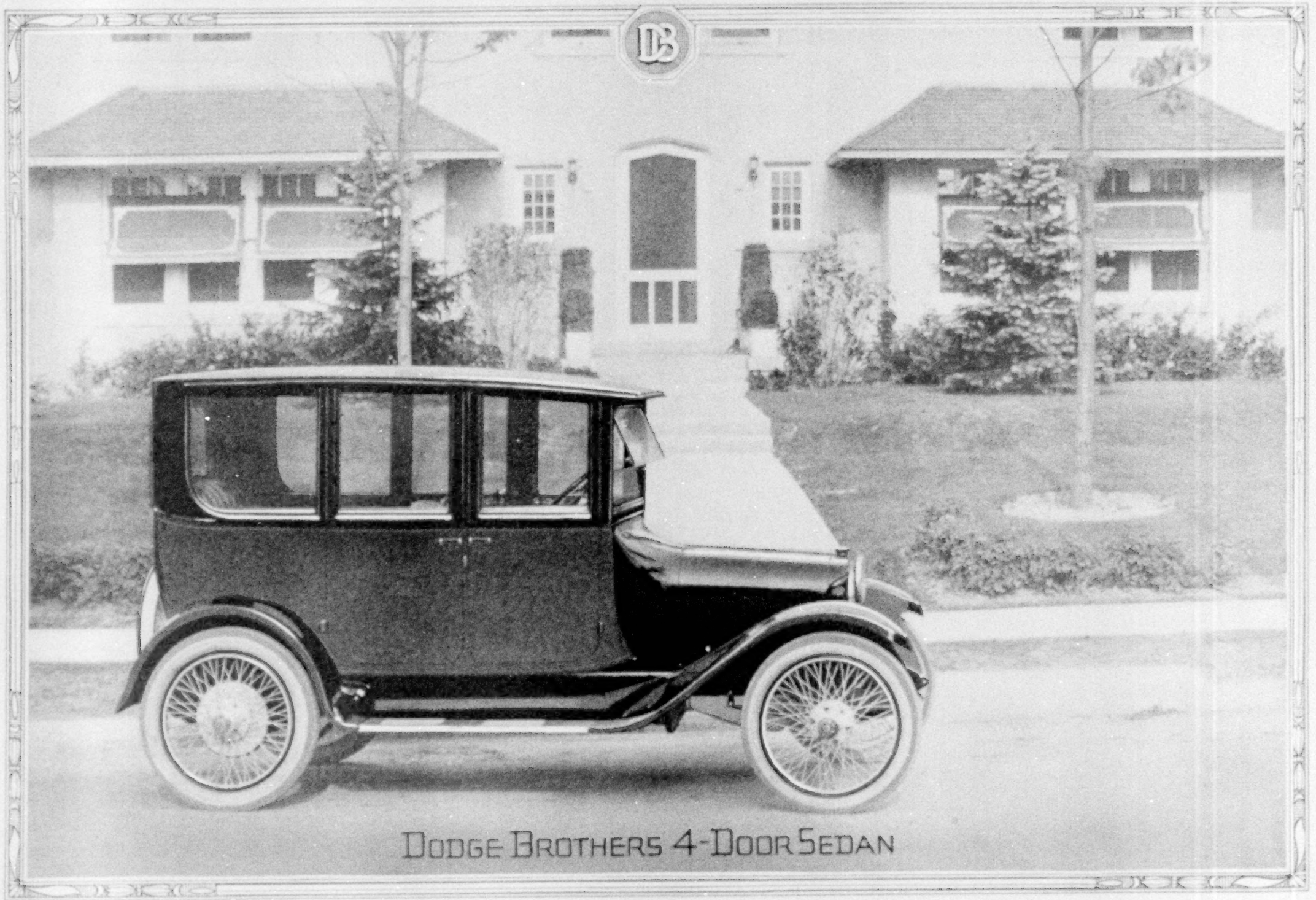
IT makes little difference whether the other fellow is to blame, or merely subject to the whims and weaknesses of his car.

The Packard owner has all the chances of the road discounted, because he is sure of what his Packard will do.

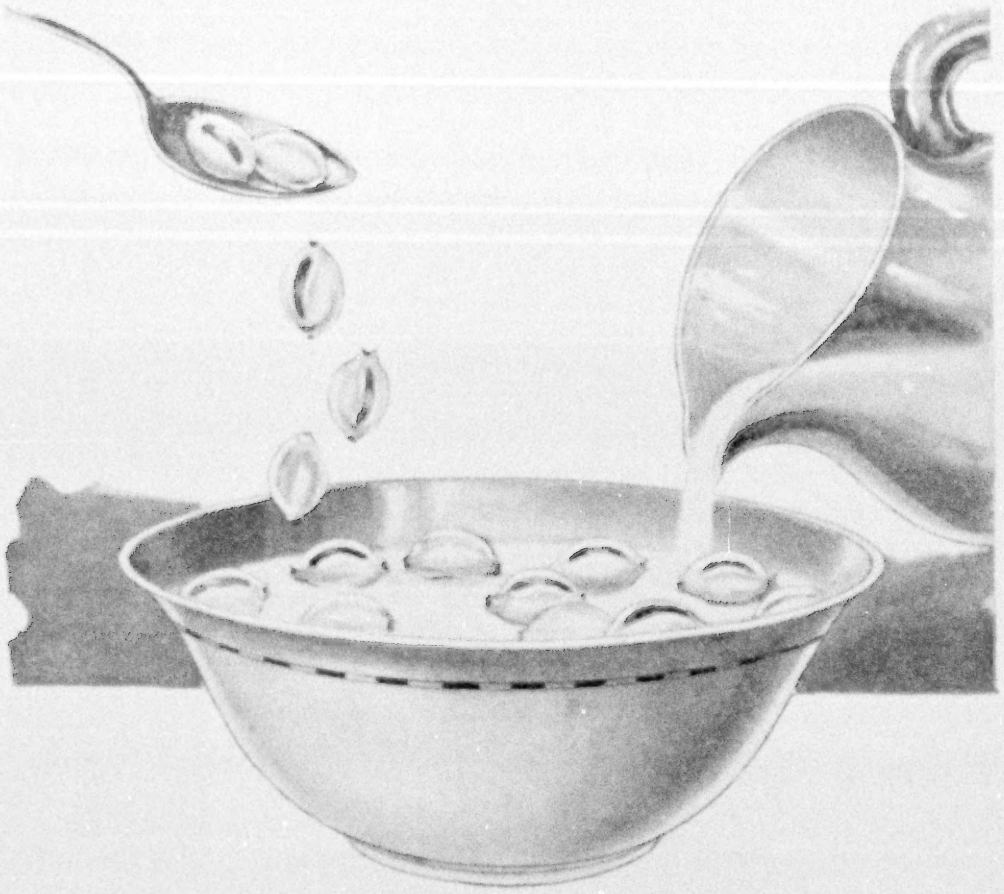
He is riding in first-class safety and first-class comfort. It costs him less *all around than riding* second class!

"Ask the Man Who Owns One"

PACKARD MOTOR CAR COMPANY, *Detroit*



DODGE BROTHERS 4-DOOR SEDAN



An invention

which has revolutionized July

Think how many new delights Prof. Anderson gave summer when he invented Puffed Grains.

The milk dish now has Puffed Wheat floating in it—thin, flimsy, toasted bubbles of whole wheat.

Breakfast brings the choice of three Puffed Grains, each with its own fascinations.

Puffed Rice now adds to berries what crust adds to a shortcake. Or a nut-like garnish to ice cream. And between meals hungry children get some Puffed Grain crisped and buttered.

Every day in summer, millions of people now enjoy these supreme food delights.

But don't treat them like mere tidbits

Puffed Wheat

Puffed Rice

Corn Puffs

All bubble grains

Also puffed rice pancake flour

These flaky, flavory bubble grains seem like food confections. But two are whole-grain foods, remember. And all are scientific.

They are made by steam explosion. Every food cell is thus blasted so digestion is easy and complete.

They are the best-cooked cereals in existence—the only cereals so ideally fitted to digest.

They are all-hour foods. They make whole-grain foods tempting. Let children find them handy, morning, noon, and night.

The Quaker Oats Company

Sole Makers

(3398)

"The Magneto Functioned Perfectly"

Remarkable Trip of the Indiana Motor Truck—The "Helomido"

From Marion, Indiana, to Los Angeles, Cal.

3279 Miles

Through miles of hub-deep Illinois Gumbo—across the Great American Desert and through the Salt Marshes of Utah—over mountains and into valleys went the Indiana 2-ton truck "Helomido," the "Good Roads Booster"

EQUIPPED WITH MAGNETO IGNITION

Since making this unusual journey from Indiana to California, the "Helomido" has traveled from Indiana to Florida, up the Atlantic Coast to New York, and from there to Wilkes-Barre, Pa.,

With Never a Sign of Faltering or Trouble With Its Ignition

For a trip of this nature, the Engineers of the Indiana Truck Corporation required units of the very highest possible standard. They knew that when hundreds of miles from a large city, with no Service Station available, the source of Ignition must be absolutely dependable—and the magneto "functioned perfectly."

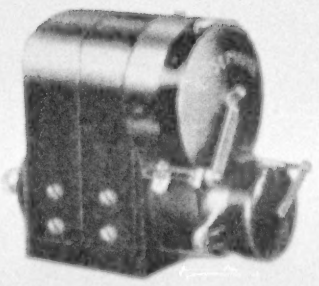
OF COURSE, IT WAS AN

EISEMANN
MAGNETO

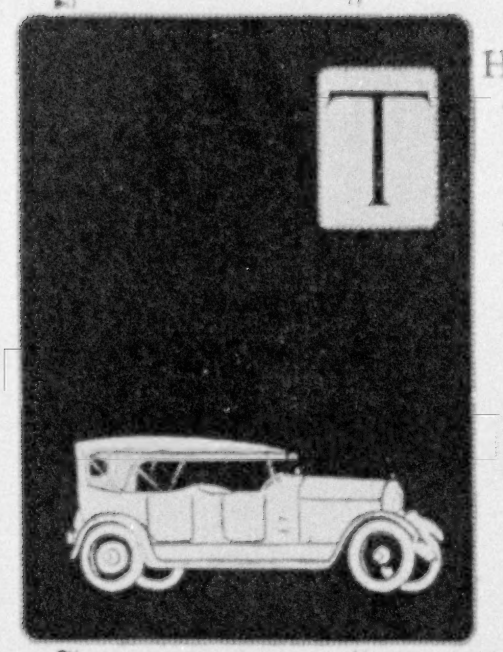
The
Eisemann Magneto Corporation
32-33rd Street, Brooklyn, N. Y.

Chicago—1469 So. Michigan Ave.
Detroit—85 Willis Ave., West

Magneto Ignition



The new MARMON idea
in motor-car selling



THERE has been no problem to sell the latest Marmon 34's —for anxious buyers await each completed car.

Such is the tribute to advanced engineering—and most important of all, it comes from canny men—graduate motorists who choose the Marmon 34 as their final car.

A far more interesting situation has arisen—one that grew before we realized it—so engrossed were we in making allotments of our current production:

—the public began to think of the Marmon 34 as a *Series!*

—the "second-hand" Marmon market disappeared!

—renewed Marmons of the 34 series—dated during six years—began to command an unusual market!

Restoration is so simple that any Marmon of the 34 series can be brought to complete usefulness and satisfaction.

And every one brings betterments not found even in new cars of like price.

Because basically sound

This situation brings renewed Marmons at a lesser price. It insures stabilized value to each purchaser of a *new* Marmon.

And all this we owe, of course, to advanced engineering and stabilized design. These principles account for long life, lasting newness.

Of the 16,500 Marmon 34's built to date all are now brought into service as permanent cars, easily kept up to standard.

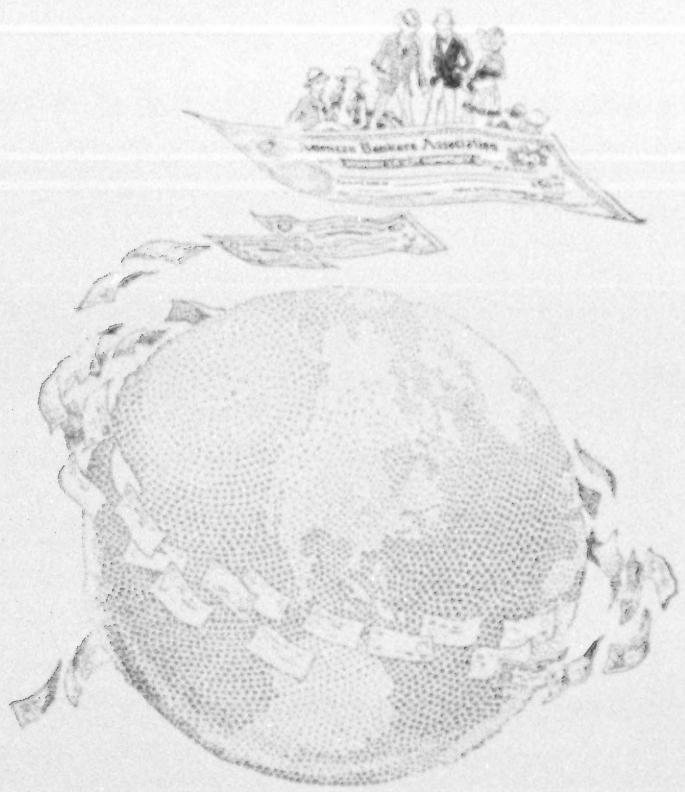
Authorized Marmon distributors, under factory guidance, know how to make complete renewal. And to prove it, they back each renewed Marmon 34 with a liberal guarantee.

To understand the importance of this new era, visit a Marmon distributor. Let him show you how stabilized design has brought stabilized investment.

The

MARMON 34

NORDYKE & MARMON COMPANY
Established 1851
INDIANAPOLIS, IND.



"A·B·A" CHEQUES GO ROUND THE WORLD

THERE are strange and out-of-the-way places in this world, but none of them is strange to "A. B. A." Cheques—The Best Funds for Travelers. Wherever civilization has penetrated, these cheques have become a familiar medium of exchange and brought comfort and aid to thousands of tourists.

HOTELS, stores and transportation companies everywhere know and accept them, and those who use them are independent of banking hours, free from the annoyance of money exchange and protected from loss or theft. Your countersignature, written in the presence of the acceptor, automatically identifies you. Without it the cheques are valueless.

IN denominations of $10, $20, $50 and $100. Conveniently carried in a small, compact wallet. Issued by the American Bankers Association, composed of 20,000 leading American Banks and Trust Companies.

"A·B·A" American Bankers Association Cheques

"the BEST funds for travelers"

For further particulars write

BANKERS TRUST COMPANY
New York City

"Mention The Geographic—It identifies you"

General Motors Trucks

GENUINE quality stands first among the requirements in GMC construction. Nothing is allowed to interfere.

Sacrifice of quality either for the sake of larger production or to make a lower price possible, is never considered.

Increased production is attained by greater facilities, and price is always an after consideration. It is based on quality.

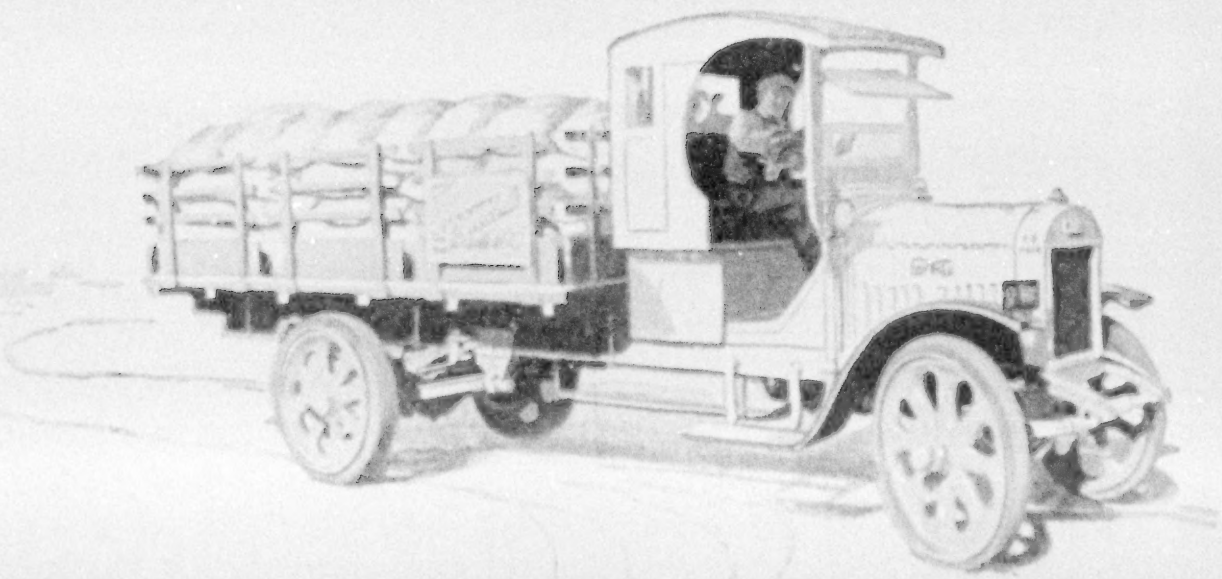
Quality is the best guarantee of satisfaction to the user and success for the maker.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

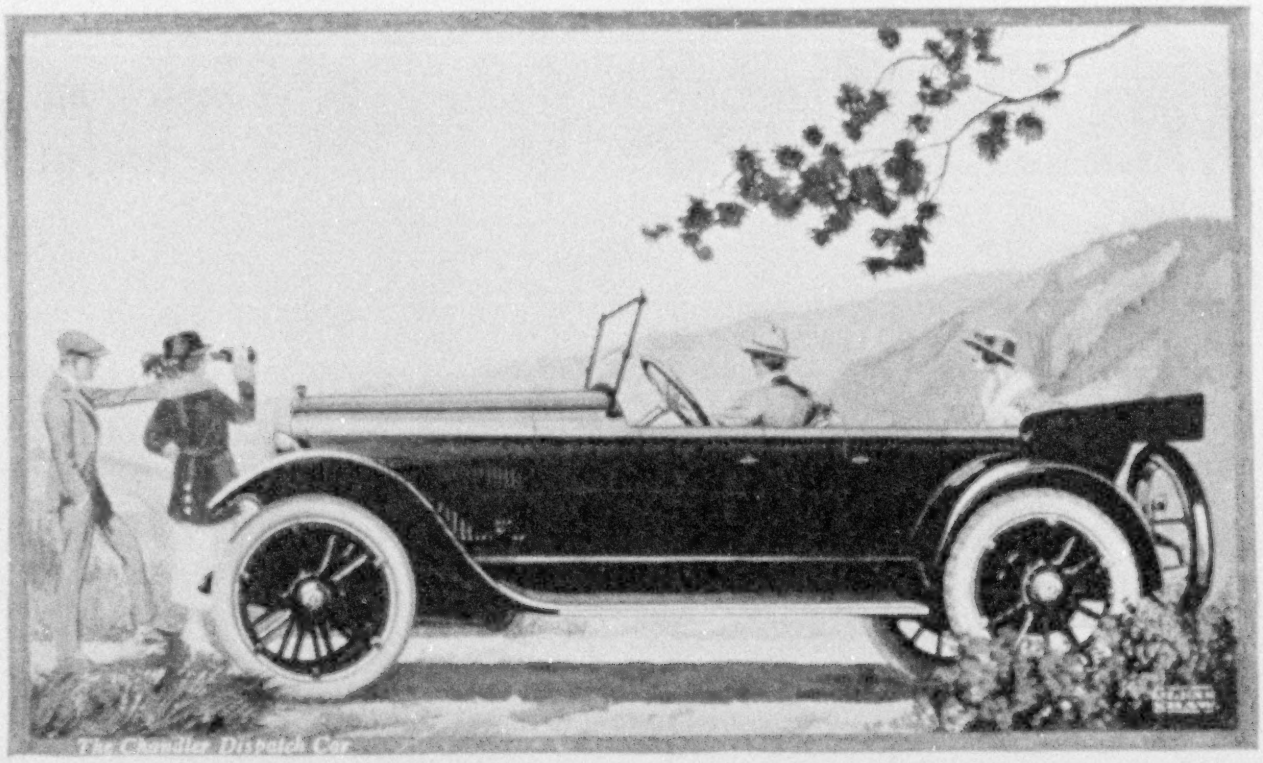
PONTIAC, MICH.

(673)



CHANDLER SIX

Famous For Its Marvelous Motor



The Chandler Dispatch Car

Why The Chandler Holds Its Leadership

THE Chandler car has attained and held its place of leadership among all sixes, by steadfast pursuance of worthy policies.

There is but one Chandler car, one Chandler chassis. To that chassis, for seven years, have been devoted the ambitions and the engineering ability and the sincere purposes of its builders.

Featuring this sturdy chassis is the famous Chandler motor, brought to a plane approximating perfection through these years of refinement and development.

Nearly eighty thousand Chandler owners know the excellence of this motor. They know its power, and the flexibility of its power. They know its endurance. They know its economy. They know it affords all the speed that any responsible driver would ever wish or dare to use. They know that on mountain roads it leads the way up.

On this one chassis are six handsome and comfortable types of body, built by America's best body-builders and splendidly finished and cushioned.

You Will Be Delighted With a Chandler

SIX SPLENDID BODY TYPES

Seven-Passenger Touring Car, $1995 *Four-Passenger Roadster, $1995*

Four-Passenger Dispatch Car, $2075

Seven-Passenger Sedan, $2995 *Four-Passenger Coupe, $2895* *Limousine, $3495*

(All prices f. o. b. Cleveland, Ohio)

Dealers in all Principal Cities and Hundreds of Towns

CHANDLER MOTOR CAR COMPANY, CLEVELAND, OHIO

Export Department: 5 Columbus Circle, New York Cable Address: "CHANMOTOR"

Reproduced from a painting in oil of the beautiful Lake Forest estate of Harold F. McCormick

VERY often trees die of thirst—just plain thirst.

On a certain Long Island country estate several beautiful trees were withering and dying. The owner could find no cause for their rapid decline. There was no evidence of serious decay, no apparent blight or tree disease of any kind.

He called in Davey Tree Surgeons to diagnose the trouble. They made a careful examination and discovered that the trees were dying of thirst—despite an abundant rainfall. Investigation soon disclosed the reason—in laying out the site a higher elevation on two sides of the house was desired, and this was secured by filling. Around the trees in question a foot or more of heavy clay was tamped in and thick sod laid on top. As a result, water was absolutely shut off from the roots of the trees, and the air also was excluded.

Davey Tree Surgeons were not consulted any too soon—the trees would not have lived through the summer—a few of them were too far gone and died, anyway. A scientific system of root irrigation was installed, and the trees that could be saved are now in a healthy and flourishing condition.

What is the real condition of your trees? Most of the enemies of tree life—disease, decay, thirst, insect enemies—are not apparent to the untrained eye. Davey Tree Surgeons will examine your trees and tell you their condition and their needs. Write us promptly.

THE DAVEY TREE EXPERT CO., Inc., 1507 Elm St., Kent, Ohio

Branch Offices with telephone connections: New York City, Astor Court Building; Chicago, Westminster Building; Baltimore, American Building; Philadelphia, Land Title Building, and Boston. Write nearest office.

Among prominent persons served by Davey Tree Surgeons are

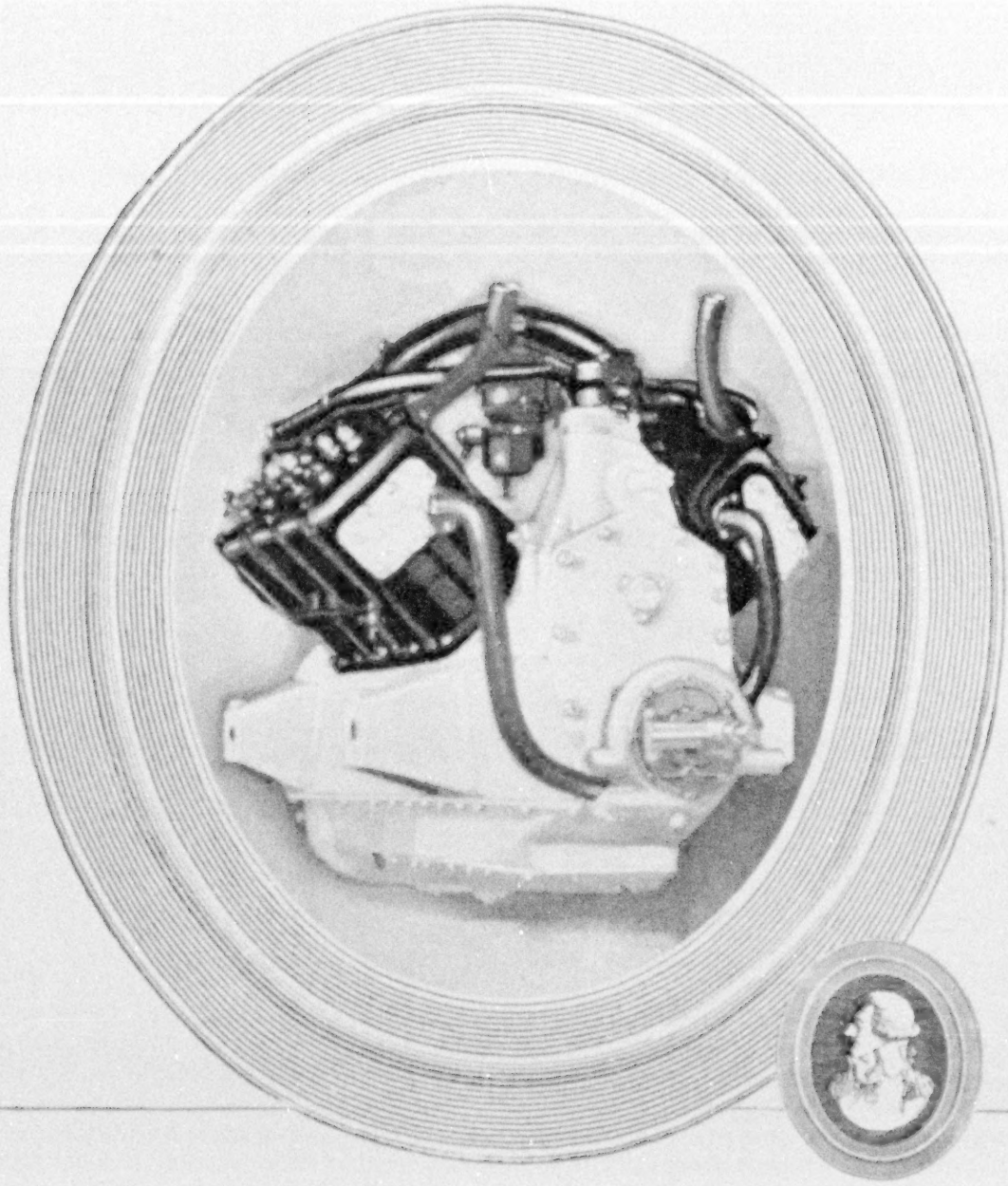
A. LINCOLN FILENE
MRS. FREDERIC DELANO HITCH
CLAUDE MEEKER
GEORGIA STATE CAPITOL
MRS. R. L. IRELAND
SAM A. LEWISOHN
DR. HENRY BARTON JACOBS
HARRY HARKNESS FLAGLER

JOHN DAVEY
Father of Tree Surgery

Permanent representatives available in districts surrounding Boston, Springfield, Lenox, Newport, Hartford, Stamford, Albany, Poughkeepsie, White Plains, Jamaica, Montclair, New York, Philadelphia, Harrisburg, Baltimore, Washington, Richmond, Buffalo, Toronto, Pittsburgh, Cleveland, Detroit, Cincinnati, Chicago, Milwaukee, and St. Louis. Canadian address: 252 Langauchitere West, Montreal.

DAVEY TREE SURGEONS

Every real Davey Tree Surgeon is in the employ of The Davey Tree Expert Co., Inc., and the public is cautioned against those falsely representing themselves. An agreement made with the Davey Company and not with an individual is certain evidence of genuineness



LAFAYETTE

WHAT a wonderful engine!

Not one unneeded bolt nor unessential ounce of weight.

Delivering tremendous torque, over an unexampled range of engine speeds, it summons more than ninety horsepower to its purpose.

Yet simplicity runs through it like a theme.

The power travels in a straight line from crankshaft to differential pinion gear.

There is but one universal joint and it is automatically lubricated from the transmission.

Like the oil-pump, the water-pump drives on the crankshaft, eliminating all gears and their attendant auxiliaries.

The crankshaft of hollowed chrome-nickel steel has five bearings to insure rigidity and strength at speed.

As in the engine, so throughout the car; in every part as in the whole the discerning mind will read consummate engineering, and so reading rank LA FAYETTE high, among the finest motor cars of all the world.

LAFAYETTE MOTORS COMPANY at Crown Hill INDIANAPOLIS

FAIRBANKS-MORSE

Keeping the World's Traffic Moving

The contribution of Fairbanks-Morse to the development of America's railways has been no small one.

Wherever these steel highways have penetrated, you will find railway equipment manufactured by Fairbanks-Morse helping to keep the world's traffic moving.

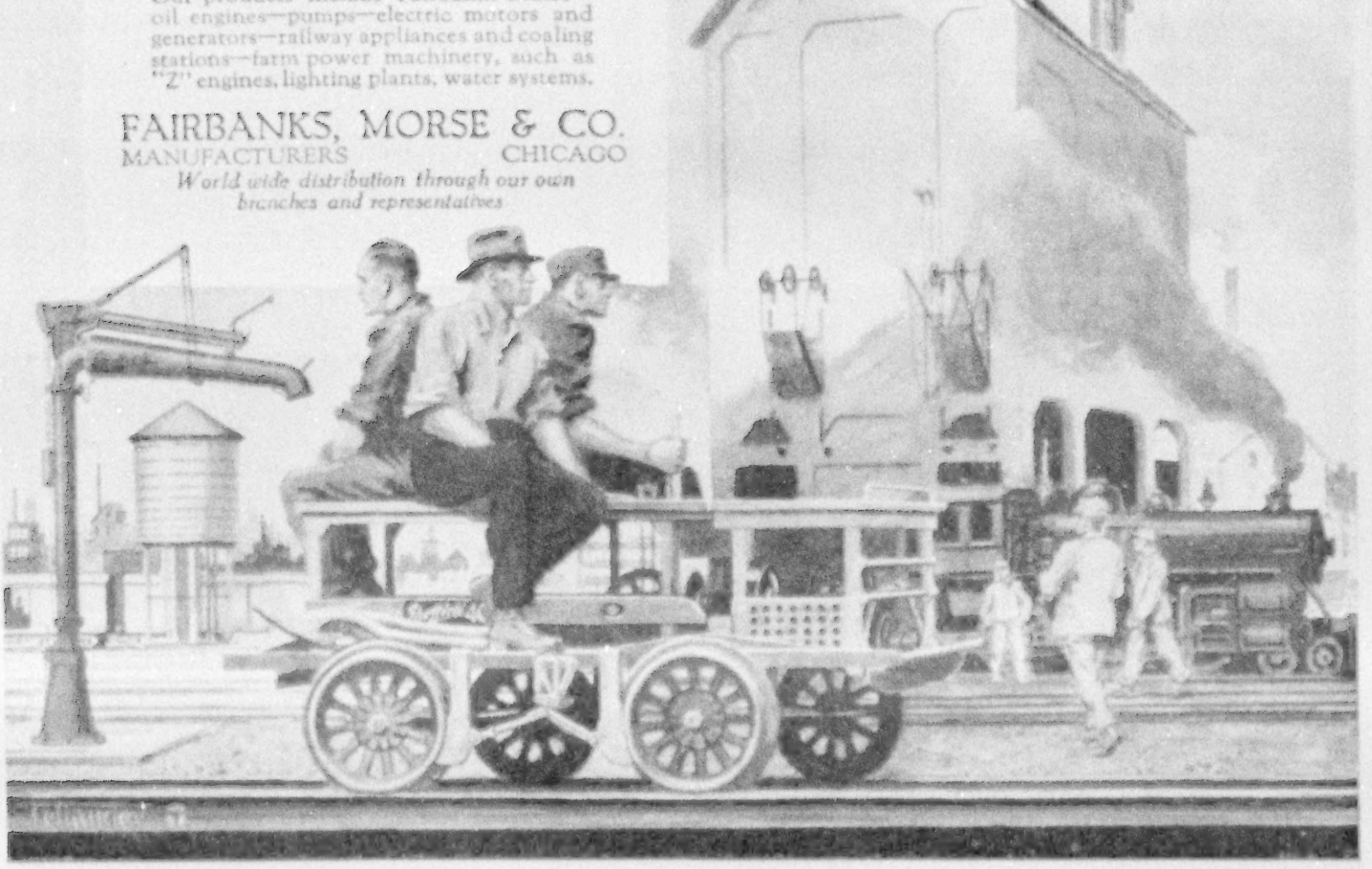
Our Sheffield Motor Cars patrol many thousands of miles of track throughout the world. Pumps made by us supply vast quantities of water for railroad use. And Coaling Stations designed, built and equipped by Fairbanks-Morse furnish fuel for locomotives all over America.

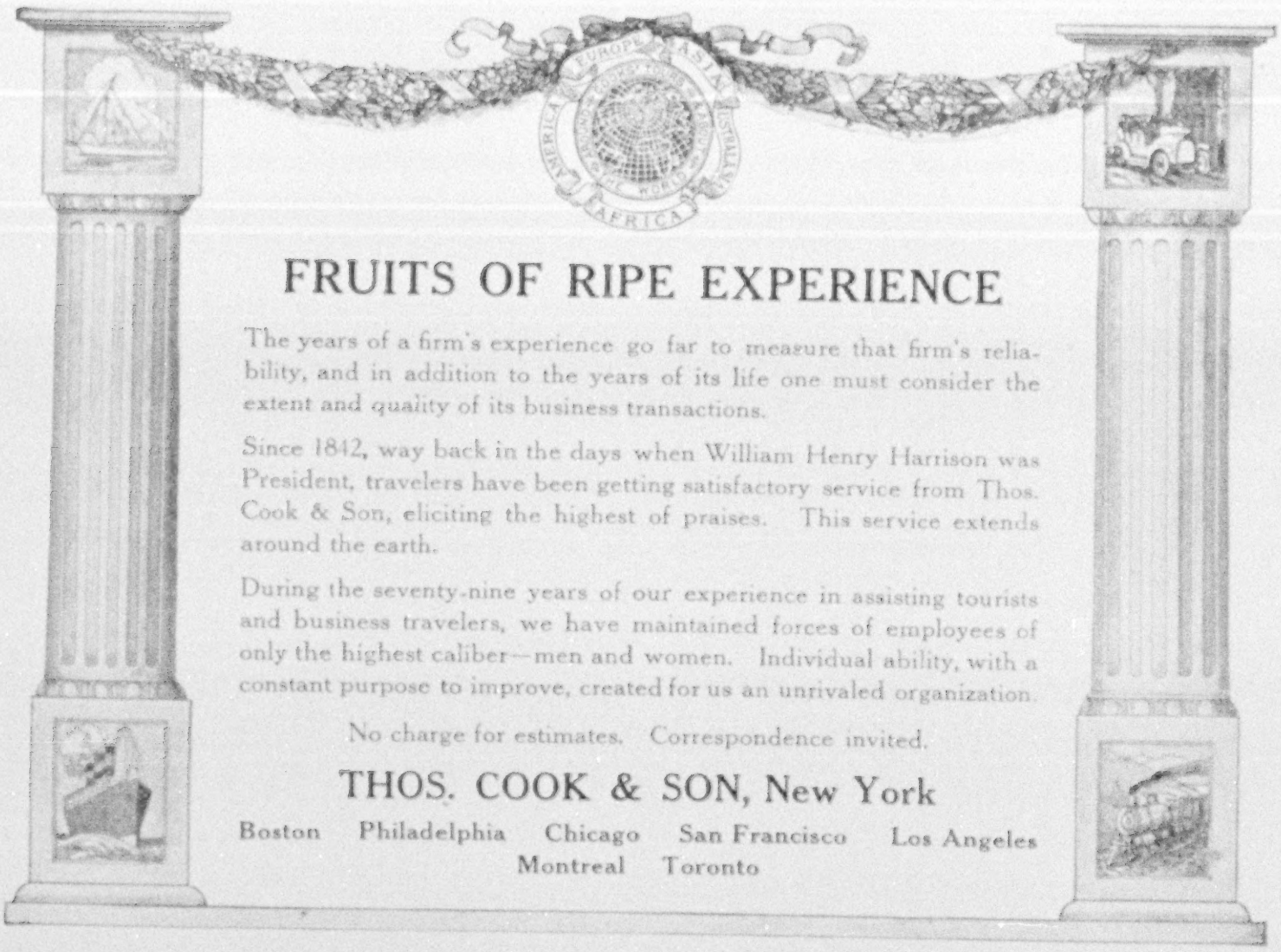
Dependability in products for railroad use is a primary requisite. All the Fairbanks-Morse railway equipment is built up to the standard of which the Quality Seal of this organization is the index.

Our products include Fairbanks Scales—oil engines—pumps—electric motors and generators—railway appliances and coaling stations—farm power machinery, such as "Z" engines, lighting plants, water systems.

FAIRBANKS, MORSE & CO.
MANUFACTURERS CHICAGO

World wide distribution through our own branches and representatives





FRUITS OF RIPE EXPERIENCE

The years of a firm's experience go far to measure that firm's reliability, and in addition to the years of its life one must consider the extent and quality of its business transactions.

Since 1842, way back in the days when William Henry Harrison was President, travelers have been getting satisfactory service from Thos. Cook & Son, eliciting the highest of praises. This service extends around the earth.

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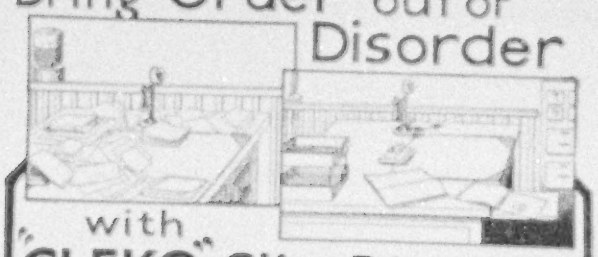

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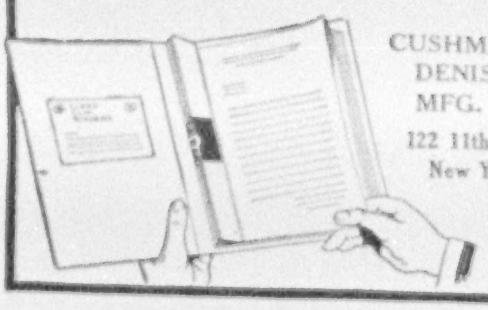

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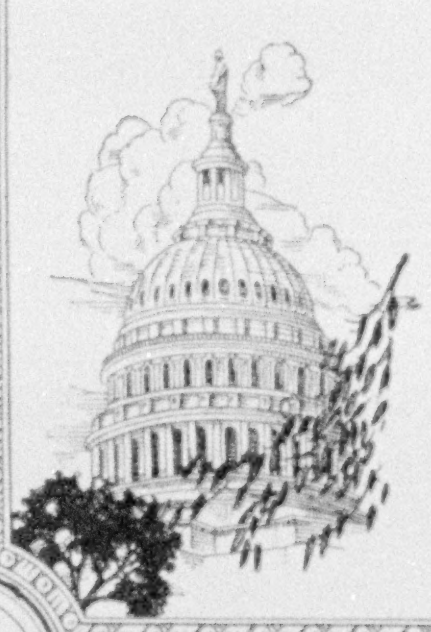

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CUBA—THE SUGAR MILL OF THE ANTILLES

BY WILLIAM JOSEPH SHOWALTER

FOR long generations the Spanish people believed that somewhere in the New World there existed a land of gold and jewels, rarer and fairer than any discovered country.

Ill-advised colonial policies deprived the Castilian Crown of the El Dorado its subjects sought—for such Cuba has become, because the world has developed a sweet tooth that must be satisfied.

The rivers of sugar flowing out and the streams of gold flowing in are transforming the island that Christopher Columbus pronounced the fairest land he had ever seen into a realm where prosperity runs riot.

They have made it the scene of a new romance of a thousand millionaires, with Havana as the Pittsburgh and sugar as the steel of the story.

THE IMMENSITY OF THE SUGAR INDUSTRY

With a sugar production nearly doubled and prices more than quadrupled since 1912, one can readily see why Cuba is the world's El Dorado of 1920, and why sugar is its king.

The imagination is almost overpowered in attempting to comprehend the vast proportions of the sugar industry of the island as it exists this year.

The cane produced is of such tremendous volume that a procession of bull teams like those on page 13, four abreast, reaching around the earth, would be required to move it. The crop would suffice to build a solid wall around the entire two thousand miles of the island's coast-line as high as an ordinary dwelling-house and thick enough for a file of four men to walk abreast on it.

The sugar extracted from this cane would load a fleet of steamers reaching from Havana to New York, with a ship for every mile of the twelve hundred that stretch between the two ports. The great pyramid of Cheops, before whose awe-inspiring proportions millions of people have stood and gazed in open-mouthed amazement, remains, after five thousand years, unrivaled as a monumental pile; but Cuba's sugar output this year would make two pyramids, each outbasing and overtopping Cheops.

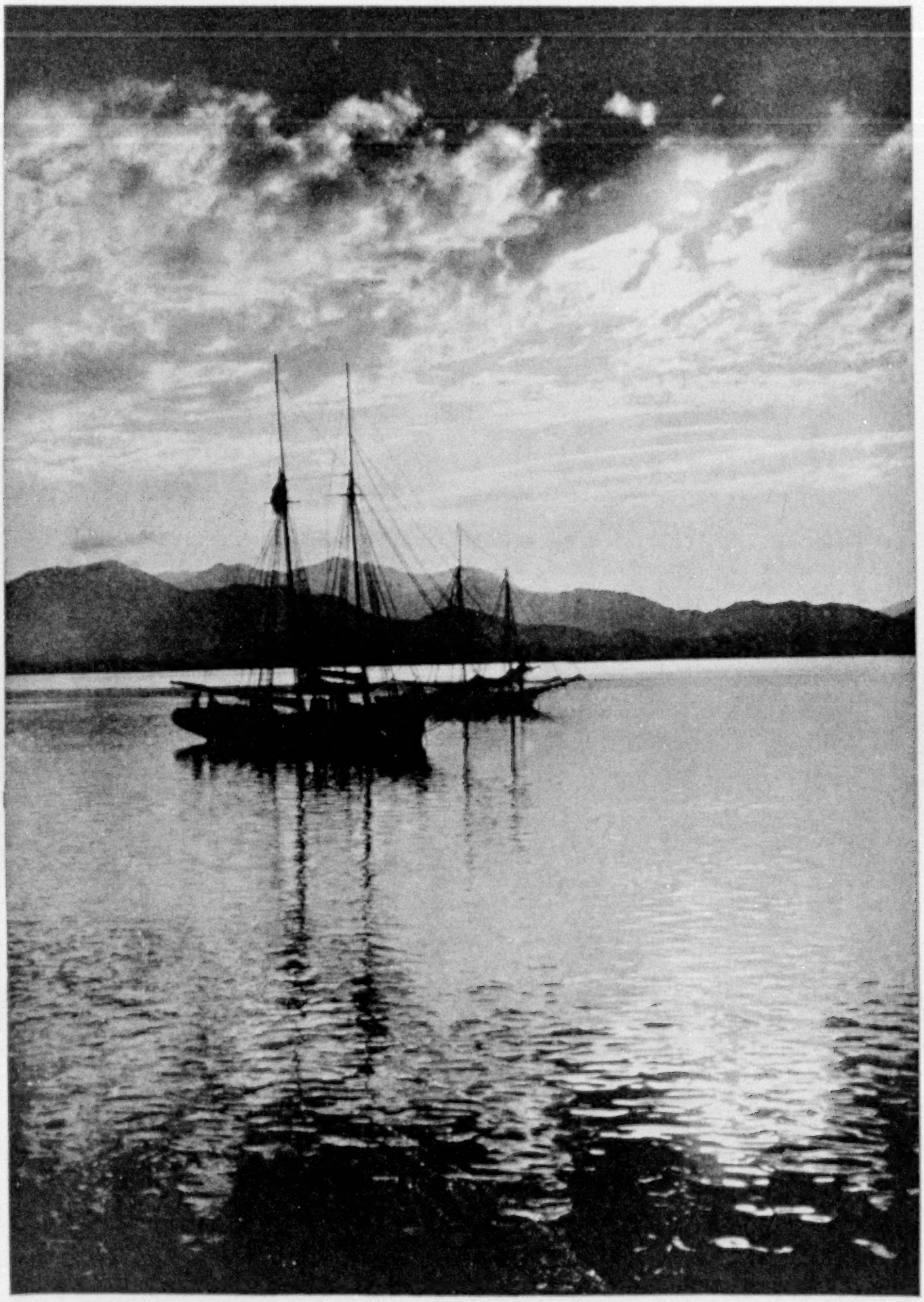
The wealth the outgoing sugar crop brings in is not less remarkable in its proportions. Four hundred dollars out of a single crop for every human being who lives on the island—a sum almost as great as the per capita wealth produced by all the farms, all the factories, and all the mines of the United States!

What wonder, then, that Cuba today is a land of gold and gems, richer than Midas ever was, converting Crœsus, by contrast, into a beggar! (See pages 12-18, 20-30.)

AN UNPRECEDENTED DEMAND FOR CIGARS

Nor is sugar the only source of wealth that our fair neighbor across the Straits of Florida possesses. Wherever men dine well, whether in Brussels or Bombay, Sydney or Chicago, Rio or the Riviera, Havana cigars follow the coffee.

Never before was there such a demand as now for fine cigars. The masses in most countries may be impoverished as



Photograph from American Photograph Company

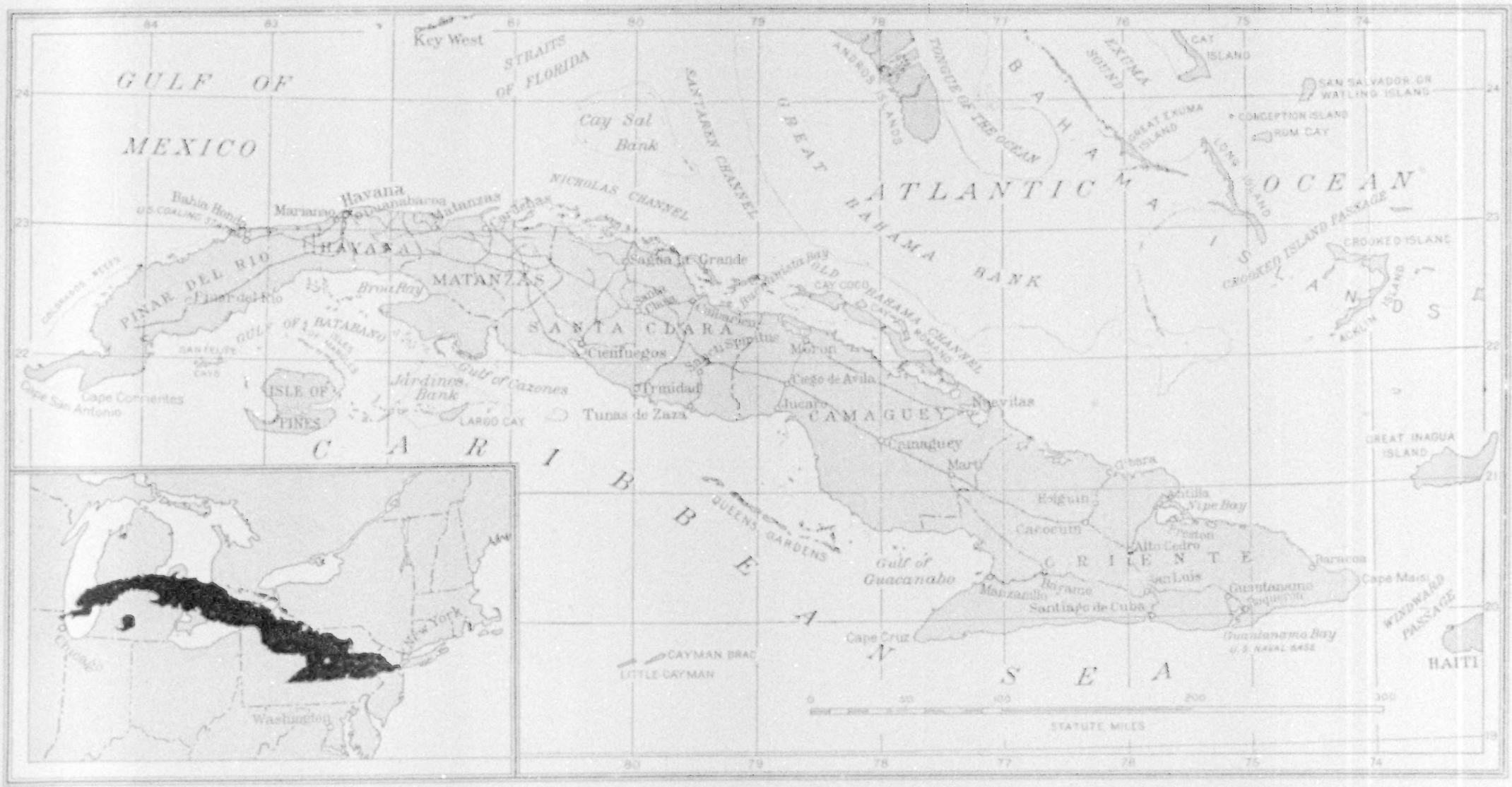
A MOONLIGHT NIGHT ON NIPE BAY: CUBA

This wonderful harbor, said to be the third largest in the world, is located on the coast of northeastern Cuba, across the island from Santiago. The fleets of the world might ride on its broad bosom, yet the outlet to the sea is so narrow that one could almost throw a stone to either bank from the deck of an outgoing steamer. The sugar industry of eastern Cuba centers around this bay.

© Underwood and Underwood

ONE OF THOUSANDS OF AVENUES OF PALMS IN CUBA

As the traveler journeys through the island, such a palm avenue is to be seen in almost every landscape. Many such avenues once led to the mansions of rich plantations; but now in many instances the houses are gone, the roadways are overgrown with tropical vegetation, and only the palm trees remain to tell the story of the changes wrought by the passing centuries.



Drawn by A. H. Bumstead

A MAP OF CUBA AND THE NEIGHBORING BAHAMA ISLANDS

The small inset shows the length of the island, comparable to the distance between New York and Chicago. In width it averages only sixty miles, and no place on the island is more than forty miles from the open sea. Among its chief commercial assets are its numerous excellent roadsteads. In area Cuba is equal to Pennsylvania, in the number of inhabitants it equals Georgia.

the result of the nightmare of war through which the world so recently came, but both the number of those who insist on Havana cigars and the number of cigars they smoke have increased at such a prodigious pace that every factory in Cuba is being forced to scale its orders.

One Havana corporation specializing in choice brands is said to have received an order for fifty million cigars. It could only undertake to deliver twenty million. Practically every Cuban factory has so many unfilled orders that each could run a full year without new business.

THE GEOGRAPHY OF CUBA

Few people appreciate either the dimensions or the area of Cuba. If you were to place the eastern tip of the island—Cape Maisi—flush with Barnegat Beach, New Jersey, on a map of the United States of like scale, Cape San Antonio, the western land's end, would touch the eastern border of Illinois, spanning the five States of New Jersey, Delaware, Pennsylvania, Ohio, and Indiana.

If those unfamiliar with the island are surprised at its length, a realization of its width, averaging only about sixty miles, likewise surprises. No place on the island is more than forty miles from the open sea. In area it is a Pennsylvania, and it has a population numerically equivalent to that of Georgia.

Nature and history have conspired to make Cuba a land of enchantment.

One approaches the island through sapphire seas. Its north shore, to the west of Florida Straits, is washed by the Gulf of Mexico and that to the east by the Atlantic Ocean; while the south shore is laved by the beautiful waters of the Caribbean. Both shores are fringed with myriad islands, idyllic spots unvisited by modern things.

AMONG THE WORLD'S FINEST HARBORS

No other land in the New World possesses proportionately such numerous and wonderful bays. Most of them are distinguished for their bottle-necked entrances, vast areas of water being entirely surrounded by land, except for narrow channels to the sea, through which ships gain access to matchless roadsteads.

An example of these splendidly sheltered harbors is Nipe Bay, on the northeastern coast. It is said to be the third largest harbor in the world. The storm-tossed ships of every sea might find peaceful anchorage there, with room to spare; and yet the entrance is so narrow that, once inside, one seems on a lake rather than in a bay.

Similarly, at Santiago, as one passes the frowning bastions of Morro Fortress, the narrow channel seems thoroughly clogged with small islands, but once past these the voyager enters a broad and charming bay.

The scenery of Cuba is as varied as heart could wish, and as the visitor journeys the length of the island, scenes of unrivaled beauty greet the eye—the low country is begemmed with valleys where innumerable avenues of royal palms wave their crowns of spreading fronds and lend enchantment to the landscape.

For one who loves mountain scenery, there are occasional spots where the Andes and the Rockies may be seen in miniature. The Vinales Valley, for instance, in the northwestern part of the island, has been pronounced one of the finest between Alaska and Panama. In many places the mountains are a veritable jumble of weird and fantastic shapes.

THE CALL OF HISTORY

What stirring story of the Spanish Main—of buccaneer, pirate, and privateer—lacks a Cuban end or a Cuban counterpart? What terrible tale of national suffering surpasses the agonizing days when the whole rural population, under the iron hand of Weylerism, was huddled into reconcentrado camps and starvation stalked in every household?

Outside of Havana Harbor, in the eternal calm that pervades the depths of the ocean, lies the shivered hulk of the battleship *Maine*, whose destruction by treacherous hands brought the banner of the forty-five stars to the side of the flag with one.

Along the southeastern shore are strewn the wrecks of that Spanish Armada whose defeat on July 4, 1898, made Cuba Libre a reality.

In Santiago one may sit at the banquet table where Admiral Cervera, with tears in his eyes, declared that on the morning of the morrow his fleet would go forth

Photograph by Walter RuKeyser

CHICKEN COOPS AT THE HAVANA CITY JAIL: CUBA

The average Cuban is as fond of cockfights as the average American is devoted to baseball. It would take a linguistic scholar to unscramble the bedlam of betting jargon one hears at a Cuban cocking main.

to what seemed a hopeless battle, but a necessary one, since no Spanish sailor could prefer ignominious surrender to an honorable, though losing, fight.

PREPARING FOR THE TOURIST

The raw material for making Cuba an ideal land for the individual who seeks sunshine in the winter is certainly present in an abandon of richness. That much is still lacking in the development of this material is evident to any one who has taken "pot luck" with the rank and file of those who fled from the cold and the snow of the north.

Almost every person who visits Cuba on pleasure bent lands in Havana, and comparatively few get more than twenty miles away from that city's central park.

If New York, Chicago, Philadelphia, Boston, and Washington were consolidated, the resulting metropolis would bear about the same relation to the United States that Havana bears to Cuba. The capital city is the home of more people than are embraced in the combined populations of all the other cities and towns of the Republic that have more than 4,000 inhabitants. Its closest rival is Santiago, but that city has only one-tenth as many people.

All of the big business houses in Cuba have their headquarters in Havana and some of the banks have built skyscraper homes.

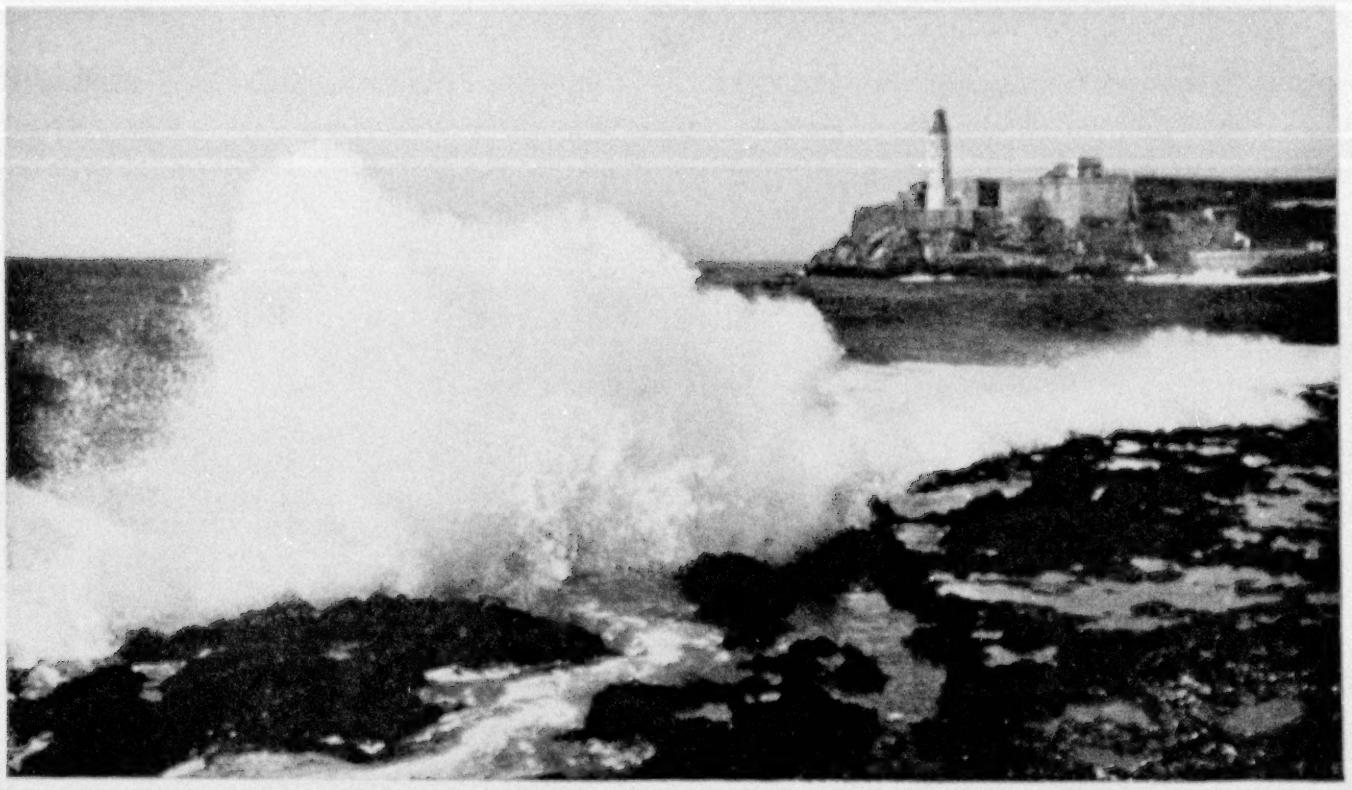
As half the country's urban population is centered in Havana, so also is half of its shipping. The city normally handles a greater foreign tonnage than any other port in the Western Hemisphere except New York.

THE COUNTRY'S WEALTH CENTERS IN HAVANA

Most of Cuba's wealthy families have Havana homes. During the past four years the net profits of the sugar business have probably exceeded the gross returns of any other four-year period in the history of the island.

The result is that perhaps no other city in the whole world has proportionately as large a wealthy population as Havana. Nor has that population reached its climax.

Out of these conditions has grown a



Photograph by Walter RuKeyser

A VIEW OF MORRO CASTLE AND THE ENTRANCE TO THE HARBOR OF HAVANA FROM THE BASE OF THE SEA-WALL ON THE CITY SIDE OF THE HARBOR

situation where dollars are even cheaper than they are now in the United States. Tens of thousands of acres of land are being laid out in residence sites, and the Vedado district, the Riverside Drive and the Sheridan Road of Havana, is being extended until it reaches farther from the Prado than Riverside Drive from New York's City Hall Square or Sheridan Road from Chicago's Loop.

There are no advertising signs on these lots. But as one motors along one sees nestling close to the ground inconspicuous little boards, about a foot long, and half a foot wide, bearing the legend in Spanish "Sold to Mr. So and So." And Mr. So and So is usually some rich Cuban who has made a fortune out of sugar down in the provinces and is coming up to the capital for the social seasons. If not that, he is probably an American who likes to be reasonably near the country clubs, and prefers to live where the cocktail has not lost its legal status. The price of the lots is from one to three dollars a square foot, or from $43,000 to $130,000 per acre.

THE TOURIST'S BILLS

If high prices hit those to whom Havana is home, it is, of course, natural that they should strike the transient even more forcibly. Hotels everywhere are always the advance guard in the price climb, and those in Cuba have been no exception.

There is only one hotel in Havana that gives anything like the American standard of service, and its rates during the past season were $25 a day for an outside room with bath, without meals. It purposed to cater only to those to whom prices are no object; but that sort of patronage failed to develop in sufficient volume to maintain a full house.

The other hotels charged rates of from $6 to $12 for accommodations far from as good as one gets at from $3 to $6 in New York. The result was that many people who came to spend a week or ten days moved up their return dates considerably, and the tourist population changed on the average every four days.

The disappointments of the past season promise for next year a saner adjustment between rates and service.

The Cuban National Tourist Association is working out a program which aims to lay a solid foundation for a steady development of a healthy, growing tourist traffic. Under this association's plan, every room in Cuba that is open to the tourist is to be listed as soon and as long as it meets the required conditions of sanitation and moral surroundings.

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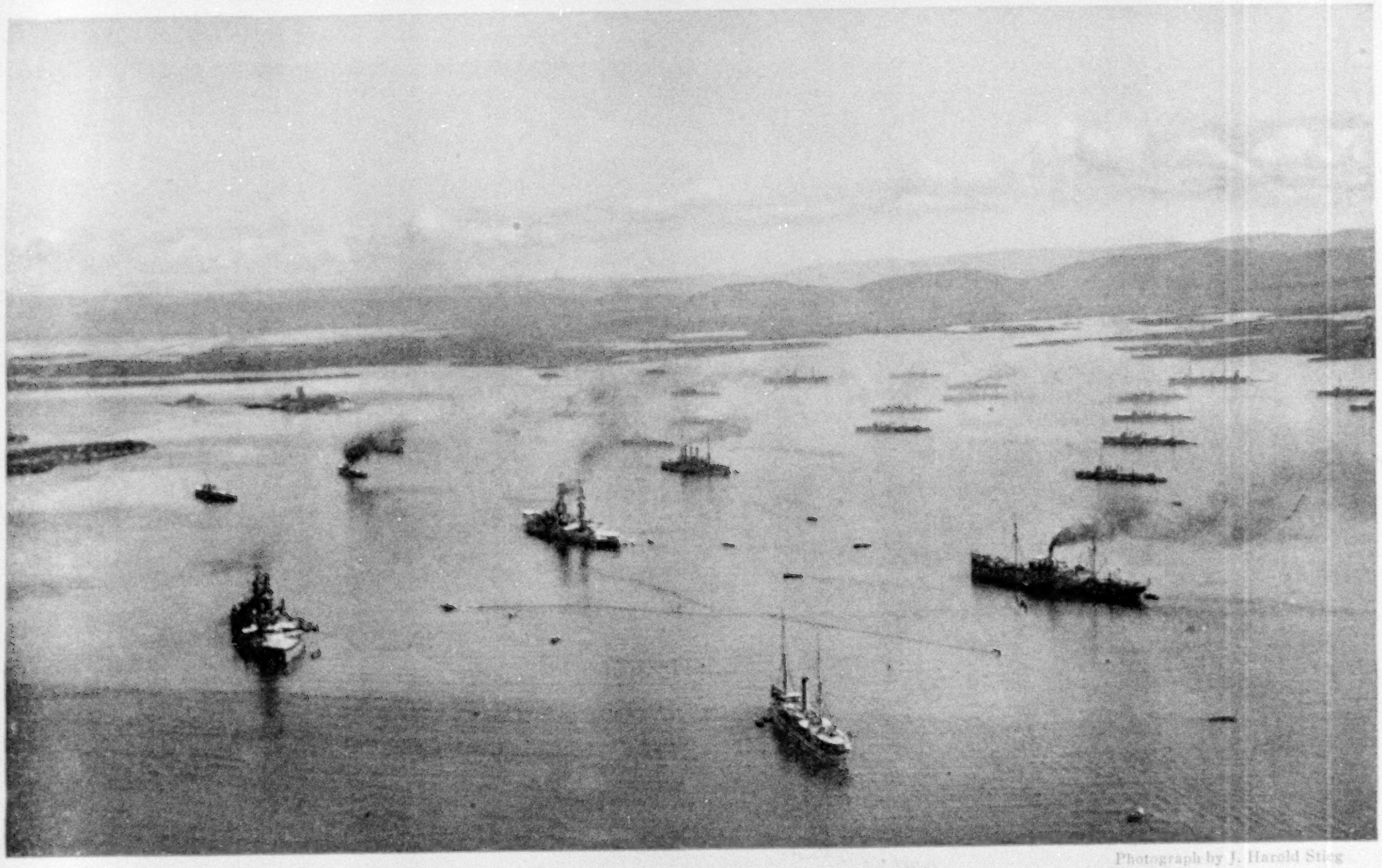
WHERE THE AMERICAN NAVY ASSEMBLES FOR ITS ANNUAL TARGET PRACTICE: GUANTANAMO BAY, CUBA

This United States naval station was established after the Spanish-American War, and is the outpost of the naval defenses of the Panama Canal. The photograph shows dreadnaughts of the Atlantic Fleet in the background. In the foreground is a navy launch discharging white-clad "bluejackets" off on a sight-seeing expedition. Palm trees, sunny beach, and dancing waters make Guantanamo a winter paradise.



Photograph by J. Harold Stieg

THE UNITED STATES NAVAL STATION AT GUANTANAMO, CUBA, AS SEEN FROM THE BASKET OF A CAPTIVE BALLOON

Cuba is one of the most favored lands in the number of its fine harbors. Guantanamo Bay lends itself to every requirement as the site of a great naval station. Here are gathered superdreadnaughts like the *Arizona* and *Pennsylvania*, hospital ships like the *Solace*, and a swarm of torpedo craft.

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AMERICAN SAILORS EATING COCONUTS AND FRESH FRUIT IN THE SHADE OF PALM TREES: CUBA

The island is so long that the distance between Cape Maisi, at the eastern end, and Cape San Antonio, at the western end, is as great as that from the New Jersey coast to the Illinois boundary. Yet at no point in the entire country can one get more than forty miles away from the sea (see text, page 5).

The price of all rooms will be printed, and every effort will be made to secure that general adherence to the principles of sound business and fair dealing which will win for Cuba the friendship of all who come and lead each of them to send others.

Arrangements have been completed, and work started on the building of several large dirigible airships for the purpose of operating a passenger air line, with a daily schedule, between Miami, Florida, and Havana. The distance between the two resorts is about 300 miles, and will be covered in approximately six hours, which calls for a flying speed of fifty miles an hour. The big "blimps" will have passenger space for from thirty to fifty persons besides the crew. Thousands of visitors to Miami heretofore have been carried to Havana on a small steamer, spending two or three days in the latter city on a personally conducted tour, and it is expected that the "Blimp Route" will prove exceedingly popular.

THE RAILROADS' PLANS

In the past there has been much to discourage the tourist who wanted to go out into the provinces. The day trains have had no parlor cars, and the coaches usually have been overcrowded. The Havana-Santiago Express has been run on a schedule of 35 hours, with a distance of only 538 miles to cover.

But next season some of the railroads intend to install facilities for handling the island's visitors in a much more satisfactory way. Parlor cars are to be put on day trains, dining-cars may be carried, and the running time of principal passenger trains reduced.

Furthermore, in order to provide proper hotel facilities in cities outside of Havana, some of the railroads are increasing the number of hostelries under their control, and have plans for bringing their hotels up to satisfactory standards.

When these improvements are instituted and English-speaking conductors or interpreters are placed on the tourist-carrying trains, it will be possible for a visitor to move leisurely through the island to Matanzas, Cienfuegos, Camagüey, and Santiago. From Santiago he can go to Antilla and take a steamer either to New York or New Orleans.

Such a trip gives a splendid view of the island, affords one a better understanding of the country, and sends one back to the United States a better citizen, with a broader grasp of the fundamentals of America's international relationships.

A DEMONSTRATION STATION IN INTERNATIONAL ALTRUISM

Cuba may well be considered a demonstration station where the theories of international altruism are under practical operation. When the United States took upon itself the burden of winning for the people of the island their independence, and then set them on their feet with a republican form of government, the world was amazed.

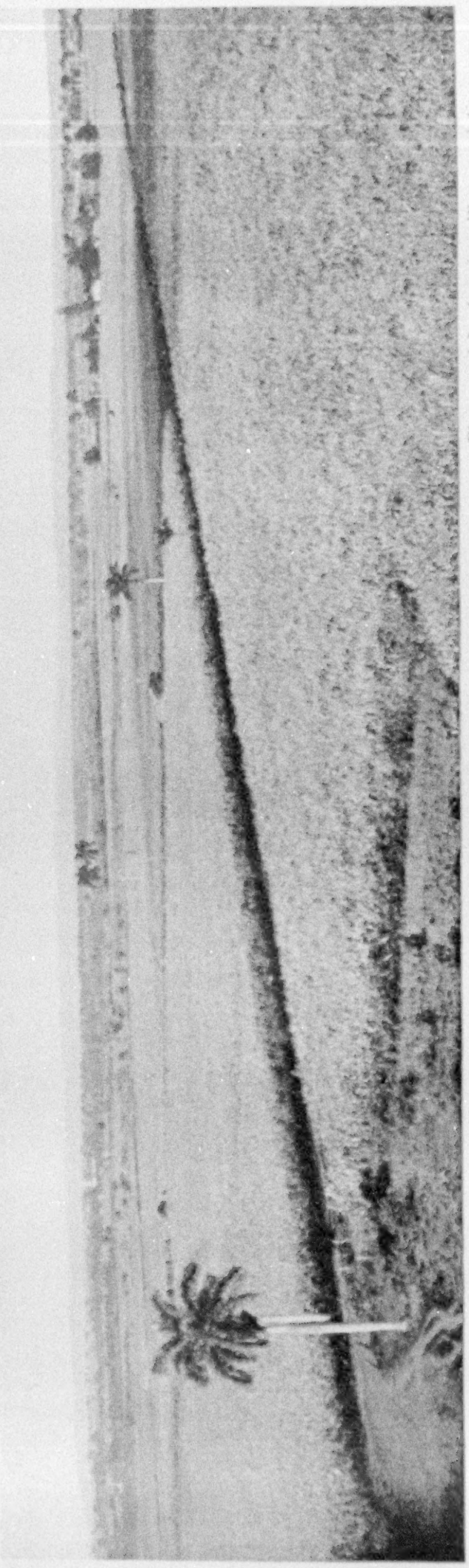
Asking only that peace be maintained, and that the conditions essential to peace be observed, Uncle Sam retired from the island. Except for the effort of José Miguel Gomez to overturn the existing government in 1917—an effort against which America promptly pledged its support to a quick ending of the revolution—peace has been maintained since the intervention, and constitutional principles have been observed.

CUBA'S PROSPERITY MEASURED

This check upon revolutions and tyranny, this guarantee of protection for foreign investments, has proved an immeasurable boon to the Cuban people. Foreign commerce comparisons tell the story. Guatemala is larger than Cuba and is almost equal in population; yet in 1918 the value of Cuba's exports was 35 times that of Guatemala's. Venezuela has nine times as much territory as Cuba and as many people; yet its 1918 exports had only one-fifteenth the value of Cuba's. Indeed, the value of Cuba's exports that year were twice as great as the combined exports of the eight countries lying between the Texas border and the South American boundary.

Less than three million people on less than fifty thousand square miles of land, with an export trade twice as large as that of twenty million people on nearly a million square miles of territory! And that was in 1918, when export values in Cuba's trade were less than half those forecast for the current fiscal year!

Was there ever such a measure of



Photograph by American Photograph Company

A TYPICAL SCENE IN THE CUBAN CANE COUNTRY

Often one may look to the horizon in every direction, his gaze encountering a sea of green cane, with only fire lines, palm trees, and the big sugar mill to break the monotony of the landscape.

prosperity as that, or such a tribute to enduring peace?

Not all of this wonderful development has been due to the American protectorate, of course. But the writer, who has visited every country that touches the Caribbean Sea and the Gulf of Mexico, and who has studied at first hand the people and the natural resources of Mexico, Central America, the West Indies, and the countries of northern South America, cannot escape the conclusion that a vast deal of Cuba's prosperity, as compared with that of its neighbors, is due to the blessing of stable government and a freedom from the stalking specter of devastating revolution.

Much to be regretted is the lack of satisfactory communication between Cuba and Porto Rico. If it were possible to plan a trip that would carry the tourist to Havana, thence to Santiago, thence to Santo Domingo, and thence to Porto Rico, one could see in a single six-weeks' tour the three stages of Latin-American development under the touch of the United States.

Santo Domingo is a land that long has been revolution-torn, and has only latterly been compelled to travel the path of peace. Its soil is as rich as that of Cuba, its people are not dissimilar, but perennial revolution has prevented its development.

When one gets to Porto Rico one finds a prosperity as great as that of Cuba, education more general than obtains in that nation, and everything possible being done to bring the masses of the people up to standards of living, habits of thought, and freedom from disease that obtain in our own country. What I wrote under the title "The Countries of the Caribbean," in the NATIONAL GEOGRAPHIC for February, 1913, and in "The Wards of the United States," in the August, 1916, number, con-

UNIVERSITY OF MICHIGAN

Photograph by American Photograph Company

WAITING TO UNLOAD CANE AT A SUGAR CENTRAL SIDING: CUBA

The 1920 harvest in Cuba will yield enough cane to load a procession of cane-carts, four abreast, reaching around the earth (see text, page 1)

Photograph by Edith S. Watson

THE SUGAR-CANE ORCHESTRA: CUBA

Everything moves to "the tune" of sugar in Cuba. Here is a little "band" of juvenile cane-cutters in the field. Sugar in the form of candy is not so popular with these island lads as the pure juice of the cane sucked from the stick. This scene may be duplicated all over Cuba from Pinar del Rio to Oriente in cane season. In the background is seen the growing cane.

trasting the progress of Cuba and Porto Rico with other tropical American lands, has been emphasized by later developments.

OVER-ADVERTISING JOHN BARLEYCORN

Many things in Havana beside its remarkable weather during our winter months interest the American tourist. From all the reports current in the United States, it might seem as if principal among these are the drinking emporiums; but, to the honor of the Americans who visit Cuba, it is just to say that the journey of the vast majority of them has had no relation whatever to the enforced flight of John Barleycorn from the shores of the United States. One sees comparatively few Americans drinking, and rarely indeed meets an intoxicated person.

The rank and file of the native popu-

Photograph from F. W. B. Hogge

HARD GOING ON A CUBAN SUGAR PLANTATION

There frequently falls, especially in the eastern part of Cuba, where the cane harvest runs far into the rainy season, as much as three inches of rain during a single downpour. The result is that the rich, deep soil becomes thoroughly saturated, and the teams of oxen have to bring every ounce of their strength into play to keep the cane moving toward the mill.

lation drink, and a large percentage of them order the kinds of drinks whose "authority" is strongly centralized; but the Cuban whisky glass holds little more than a woman's thimble, so that a standard drink is barely more than a sip, and little drunkenness results.

Probably no city has solved the problem of cheap transportation more satisfactorily than Havana. Eight thousand Ford automobiles, operating within a territory whose radius is little greater than a mile and carrying one or two persons between any two points within this territory for the sum of twenty cents, afford an individual transportation service that leaves little to be desired by those to whom the ticking of a taximeter is a matter of moment.

These cars look different from the familiar type one sees in the United States, for they have passed through the hands of Cuban upholsterers before going into commission, and these artists work a complete transformation.

Any one who has visited Havana can appreciate how luxurious a Ford can be made. "Every little Ford has a decoration all its own," might be the title of a Madame Sherry song in that city. The tin and the imitation leather of dashboard, seats, and tonneau give place to mahogany for the dash, whipcord for the body upholstery, fancy carpet for the floor, and wonderful concoctions in rainbow-hued leather for the seats.

In a single car one may see five or six different shades of leather employed in the upholstery. For instance, the basic material may be gray grained leather. This is piped with white and has touches of red, blue, and green to give a piquant effect. The whole is set off by a decoration of silver studs. It may look a little overdone to the staid citizen of the North, but it is an optical feast to the riding public of Havana, and once one is inside the car it seems to transform itself into a royal equipage.

One forgets the lack of springs in the

Photograph by American Photograph Company

TRANSFERRING THE CANE FROM OX-CARTS INTO RAILROAD CARS ON A CUBAN SUGAR PLANTATION

A modern sugar factory, or "central," as it is known in Cuba, may require 250 acres of cane a day to keep it running at capacity. Consequently, great areas of sugar land are tributary to each central, and a complete railroad system is necessary to supply the cane in sufficient quantity. At these field-loading stations the cane is weighed in the loading process (see text, page 27).

cushions and under the car in his wonderment at the Cuban upholsterer's art.

There are no speed laws in Havana, but there is heavy accountability for those who do not respect the rules of the road and who take the right of way of either pedestrian or motorist. The result is that the cars rush hither and thither like mad, but the reflex actions of the chauffeurs' feet and hands are so highly developed that they can start and stop more quickly, and swerve this way and that more adeptly than can be imagined by one who has not seen them. There is certainly much decision of character in a people who can produce such chauffeurs.

The real spirit of the Cuban Government and people toward the Americans who make pilgrimages to Havana is shown in the little booklet of taxi information distributed gratis by the National Police Department.

"You, sir," says the booklet, "have temporarily hired, or taken into your service, the vehicle number —. A Bureau of Information has been established, . . . which will furnish you with any information you need. . . . In case of doubt, call the first policeman you meet, who will be glad to help you."

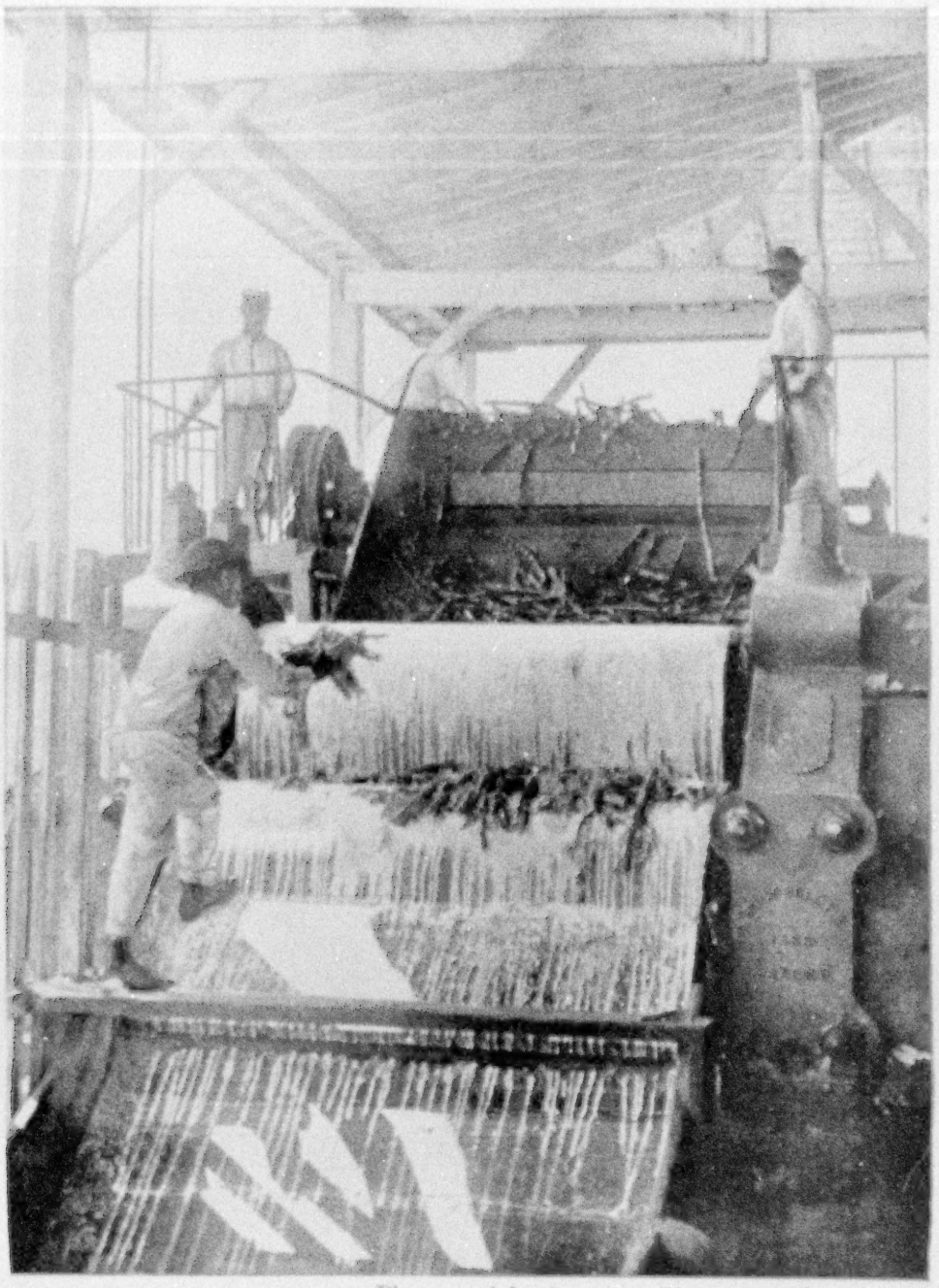
LOTTERY TICKETS EVERYWHERE

The masses of Cuba are lovers of chance. Lotteries flourish like green bay trees, and one has to run the gamut of human types in refusing to buy lottery tickets. Here is a wee bit of a girl, perhaps not yet eight years old, who appeals

to you to take a chance because it will help her widowed mother; there a poor old woman of eighty wants you to buy, so that she may get a bite to eat. Now it is the elevator boy in the hotel, now the bootblack in the barber-shop. Everywhere you turn, a lottery ticket is before you and a vendor begging you to buy.

One regrets that there is no effort made to ban this business; but the Cubans seem to take it as a matter of course, and the masses are ever ready to take another chance with each passing drawing.

Every city and town in Cuba has its cockpit, and some of them possess several. Sunday is a busy day for the roosters and their backers, and the enthusiasm with which the habitués of the cocking main wager their pesos on their favorites is unlimited. The uninitiated spectator wonders how it is possible to unscramble the bedlam of noise and to follow the changing odds.



Photograph by American Photograph Company

CRUSHING CANE IN A CUBAN SUGAR MILL

Hour after hour, day after day, week after week, the unending procession of cane is drawn into the crushing machinery and the sweet sap flows out. It is then mixed with whitewash and the impurities removed as the evaporation process proceeds (see text, page 27).

PLAYING JAI ALAI

In the whole range of professional sports there certainly has never been devised a more thrilling game than *jai alai* (pronounced high-a-ligh), which has been transplanted into Cuba from Spain.

It is a game that differs from tennis in that the court is a rectangle 210 feet long and 36 feet wide, with one side wall and two end walls. The floor is of cement and the walls of carefully laid stone. Instead of the players arranging themselves on opposite sides of a net, as in tennis, and batting the ball back and forth with rackets, they occupy in common the playing space of the court. One side serves the ball against the end wall, and on the rebound the other side must drive it back against the wall. Thus it is kept flying from players to wall and from wall to players until one side fails to return it to the wall, when the opposing team scores a point.

Instead of rackets the players use basket-woven affairs, crescent shaped, with one end laced to the right hand and

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RAW SUGAR FROM CUBA BEING TRANSFERRED FROM SHIP TO LIGHTER IN NEW YORK HARBOR ON ITS WAY TO A REFINERY IN JERSEY CITY

A fleet of sugar ships—one for each mile that stretches between Havana and New York, and each carrying upward of eight million pounds of sugar—would be required to move Cuba's present crop (see text, page 1).

the other end free. The crescent is only about a foot long and three inches thick.

A team of two players has to protect an area of 7,500 square feet, and sometimes is forced to catch a ball on the rebound from the wall at the far end of the court. To do this with such a narrow instrument as the cesta requires the utmost agility, the closest calculation, and the most astute judgment.

"MORE EXCITING THAN BASEBALL"

Speaking of the game, a recent writer says: "Jai alai, the national game of Spain, is one of the most delightful things Americans discover in Cuba. It is more exciting than baseball, squash, and polo combined. Resembling tennis, inasmuch as it is played on courts by four men, it carries the onlooker on the crest of a wave of such suspense and thrills that he is enervated at the end of each game from sheer emotion.

"Americans who have been content to howl 'take him out!' and 'attaboy!' stand on their feet and yell half an hour at a time when they see the four players from Spain in a contest that strains every muscle and forces the perspiration from every pore, so that the clothing is dripping by the time the first round is played. Not one frenzied spectator of the 4,000 ever sits down or stops yelling except in the intermission. Jai alai is no place for a contemplative attitude."

SOME OF THE WORLD'S LARGEST CLUBS IN HAVANA

Havana has some of the largest clubs in the world. There are no more clannish folk anywhere than the people from the several provinces of Spain. Those who have come from Galicia and their descendents have their club; those from Asturias have theirs, and so on. The Centro Gallego, or club of Galicia, has 43,000 members, and its club-house, which includes the National Theater, cost nearly a million dollars. The Centro Asturiano has a membership of 36,000. The Clerks' Club has a membership of 30,000. The dues in each club are $1.50 per month, and each maintains its own hospital and sanitarium.

Cuba has six provinces, the largest, Oriente, having an area somewhat larger than the State of Maryland, and the smallest, Havana, being slightly larger than Delaware. Yet each is so different from the other five that it is hard to dismiss them with a word. The very atmosphere seems different.

At the westernmost end of the island is the province of Pinar del Rio. It produces less sugar than any other province, and therefore is the least prosperous, even though it does produce the finest tobacco in the world.

As one travels through the province, all the intrusions of American civilization are left behind, the terminal moraines of Anglo-Saxon culture are swallowed up in the plains of native life, and the only thing that sounds or looks homelike to a Washingtonian is the whistle of a locomotive and an occasional box-car, bearing the name of a railroad in the States, which came across Florida Straits on the Key West-Havana ferry, loaded with flour, and will carry a load of sugar back to the Middle West.

The towns are thoroughly Latin, and the country districts, except for an occasional tobacco plantation and a few sugar centrals, seem entirely given over to a black and mulatto population, which appears content to live in thatch-roofed shacks.

PIGS, PONIES, AND GOATS

The animal life of Pinar del Rio province consists largely of dogs, chickens, pigs, ponies, and goats, in numbers ranking in the order named. Dogs one sees everywhere—little dogs, big dogs, lean dogs, fat dogs, but all of them lazy dogs. Of chickens, each shack-hold has a few, none of which would take a prize at a poultry show, though some of them might hold their own at a cocking main.

There are many pigs to be seen as one journeys through the country, but most of them are of an architectural outline that makes the Appalachian razor-back seem a prosperous porker. Each one of them is anchored fast to a peg in the ground, tethered by a rope. This is made fast to the pig in a fearful and wonderful way. If the noose were fastened around the neck only, his porkship could back out without difficulty, since his head is usually smaller than his neck. So it is passed around the pig in front of one shoulder, and behind the opposite leg,

Photograph by American Photograph Company

MOUNTAIN OF SUGAR AWAITING EXPORT IN A CUBAN WAREHOUSE

Each of these bags contains 325 pounds of sugar, and, at prices now prevailing in the Cuban export market, is worth about fifty dollars. Before the war the Cuban sugar industry was producing sugar at $1.35 a hundred pounds and selling it at $2.62. Today the same kind of sugar brings $16.00 or better a hundred pounds (see text, page 23).

XUM

and then drawn tight enough to keep him from backing out of it or creeping through it.

The horses one sees in rural Pinar del Rio are between the Texas and the Shetland pony in size and so thin that one wonders that they can make a shadow. The white splotches all over their bodies are eloquent witnesses to the countless times that saddle and harness and spur have laid bare the raw flesh. Though the ground will grow two crops of corn a year, the Pinar del Rio pony never sees an ear of it and must be content to subsist on the grass in the plot of which his tether is the radius.

Milch goats, which are the cows of Pinar del Rio, seem to be the one species of animal able, as a class, to look fat and sleek.

Havana Province is more prosperous, looks half American, and seems like southern Florida and cane-growing Louisiana in one. Crossing the boundary into Matanzas Province, one gets deep into the sugar belt. Vast areas as flat as a floor are covered with sugar-cane. On every horizon the green of the growing cane meets the blue of an arching sky, with a huge sugar central—a sugar mill and radiating railroad—in every landscape.

IN THE EASTERN PART OF THE ISLAND

Santa Clara Province lies next to the east, and one finds here, as one travels to its eastern border, the sugar industry gradually yielding place to the cattle-growing business, which in turn reaches its high tide in Camagüey. This latter province has wonderful areas of guinea-grass and other pastures on which cattle get as fat and sleek as if feasting on ensilage and cotton-seed meal on an Iowa farm.

Camagüey is a little larger than Vermont, while Santa Clara is about the size of New Hampshire.

Oriente is the Texas of Cuba, the largest and the newest of the bonanza lands within the Island Republic. A few years ago the soil of Oriente was thought unfit for sugar-growing, but today it produces more than any other province, and its development is only well begun. The largest centrals in the whole island are located there.

Cuba's principal iron deposits also are in Oriente. At Daiquiri, on the south coast, is a veritable mountain of hematite ore, which, under the sway of the American steam-shovel, has been terraced until it seems to be a vast pyramid.

On the north coast are large deposits of ore-bearing mud, which, when sufficient drying facilities are installed, promise to yield millions of tons of iron ore right at deep water. That Cuban ores will compete with Minnesota and Michigan ores at the eastern furnaces, in the years ahead, is the belief of those who know the situation.

ENGLISH IN CUBAN SCHOOLS

Cuba has just begun an experiment fraught with many possibilities in Latin-American relations. Many forward-looking Cubans have come to realize that Spanish is no longer the chief language of commerce, and that the inability of the people to speak English is a barrier to progress, since most of the business of the Republic is done with English-speaking people.

Therefore, experimental schools in English have been established, and the progress being made justifies the hope that in a generation or two Cuba will place herself in linguistic accord with the peoples with whom she has to deal.

I visited one of these schools, and the work being done was both a revelation and an inspiration. The teacher was a young woman of Cuban extraction, born and educated in New York. Her class had in it a score of typical Cuban boys, sons of small merchants and work-a-day folk.

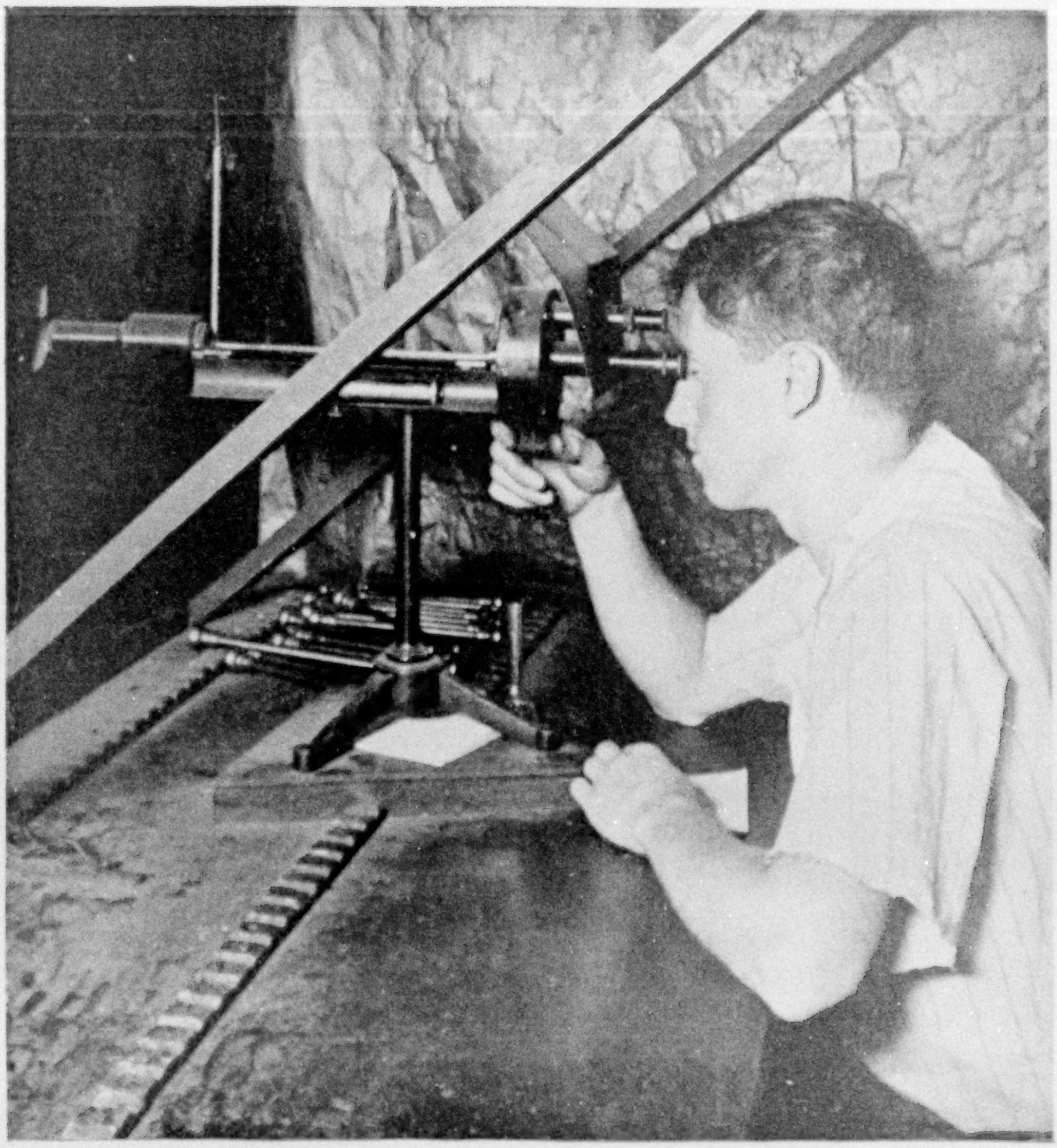
The teacher was a born instructor. "Now I sing and laugh with joy. What do you say of me when I do that?" she queried.

"You are happy," responded the chorus of youngsters, their voices as much "in step" as a West Point cadet company.

"Now I bury my face in my hands and the tears flow from my eyes. What do you say I am doing?"

"You are crying," they responded as one.

"What is the subject and what the predicate in the sentence, 'I cry'?" she queries. "'I' is the subject and 'cry' the predicate," they respond. "'I' is a pro-



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OPERATING THE POLARISCOPE IN A SUGAR-MILL LABORATORY

If a wind is blowing through a paling fence, only the straws carried in a vertical position by it can get through. The others are stopped by the fence. In the same way, only those rays of light which are, let us say, upright can get through the prism of a polariscope. These are called polarized rays. If they are passed through a solution of sugar, after passing through the prism, they are no longer upright, but lean to one side, so to speak, and are therefore unable to get through a second prism, which looks dark to the operator. He turns this prism around until its axis is parallel to the plane of the rays of light seeking to pass through it, and the distance he has to turn the prism before the light can come through tells him exactly how much the rays were deflected from an upright position in passing through the sugar, and therefore exactly how pure or impure the sugar solution is (see page 30).

noun, first person, singular, and 'cry' is the present tense of the verb 'to cry,'" they answer.

And so it goes. Every boy is so eager to answer that as a class they seem almost to fall over themselves in their effort to be first. They show a quickness in grasping the significance of number, tense, and mood that amazes the beholder. Under such a teacher, learning English is plainly a joy to the pupils. As soon as the teacher problem can be met adequately, the language of Shakespeare and O. Henry will be widely taught in the public schools.

CUBA'S SUGAR INDUSTRY

As stated in the beginning of this article, sugar is king in Cuba. Even in normal years it is the principal source of wealth. But with the restraints of "price-fixing" regulations removed, 1920 is destined to outdo any other year in the history of the industry.

Sugar-cane is grown by three classes of planters in Cuba. Perhaps the major part of the crop is grown by share farmers, or "colonos," as they are called. The owners of the sugar-mills furnish them with a given number of acres of land to plant and give them an agreed share of the sugar they produce.

The next class is composed of the land-owning farmers, who grow their own cane and have it ground on shares, after the fashion of the rural grist-mill. The remainder of the cane is grown by the owners of the mills themselves. At some centrals the "administration" cane, as that grown under "central" management is known, amounts to only 4 per cent of the total; at others it amounts to 90 per cent.

THE PROFITS OF THE PLANTERS

Even the share farmer, at pre-war prices, made money. According to "Cuba Before the World," the official handbook of the Republic at the Panama-Pacific Exposition, when sugar was selling at 2.62 cents a pound, his share of the sugar brought him, on the basis of twelve sacks to the acre, a return of from $46 to $51 per acre. The return of the planter owning his land was from $56 to $61 per acre. When one remembers that the selling price of sugar is from four to six times as high in 1920 as it was then, the size of the per-acre income today is apparent.

How much net profit the cane-grower reaps at 1920 prices is hard to estimate, but that it is large will appear when the methods of cane-growing are stated. To begin with, after the first crop the planter does not have to bother with seed-time for about ten years. The soil is so deep and so fertile that one planting produces ten harvests. Neither does cultivation bother him after the first season, for the blades stripped from one crop form a mulch that keeps the weeds from competing with the next one.

Think of the profits that the American farmer would make out of corn if he could get ten crops from one planting, and did not have to plow nine of them at all to keep down the weeds!

THE WORLD'S CHEAPEST MOTIVE POWER

Another item in the low cost of producing sugar is the cheapness of the motive power. The cane is hauled in ox-carts. The oxen live from six to ten months a year on the blades stripped from the harvested stalks, and the remainder of the year on succulent guinea-grass. Think how prosperous would be the American farmer if he could have animal motive power requiring not a pound of grain to feed it!

A great deal of the cane land produces much more sugar to the acre than the modest twelve bags that formed the basis of the calculations cited from "Cuba Before the World." According to figures furnished the writer by the Cuban Department of Agriculture, much land produces 22 bags to the acre. This, at 15 cents a pound, brings a gross return of more than $1,000 an acre.

These conditions have brought about an unprecedented boom in sugar lands. One sugar estate, which was bought some three years ago for $3,000,000, sold last January for $9,500,000. Another, which was valued at about $6,000,000 a few years ago, changed hands at $15,000,000.

Numerous new "centrals" are being built and others projected, all being capitalized on the basis of this year's earnings. Thousands of American capitalists are investing in these flourishing enterprises.

That the famine scale of prices of this year will not continue is the opinion of those who are in a position to know. Just as soon as the European sugar beet comes back into cultivation, price levels are bound to fall.

Many warnings have been sounded about the singularity of the source of Cuba's fortune. Economic safety is opposed to having too many of one's eggs in a single basket. But Cuba believes in making hay while the sun shines, though that hay be sugar and that sun the sucrose hunger of the world.

How her receipts from sugar have expanded is shown by the fact that the 1915

GENERAL VIEW OF A FAMOUS TOBACCO FARM IN THE VUELTA ABAJO REGION OF PINAR DEL RIO
Large areas are covered with cheese-cloth, under which the finest wrapper tobacco is grown.
Photograph by American Photograph Company

crop brought a total return of less than two hundred million dollars, while the 1920 crop will bring more than a billion dollars.

A ROMANCE OF MODERN INDUSTRY

The story of cane and the production of sugar from it is a romance of modern industry.

The first that the western world knew about sugar was when traders from India brought to England a substance of amazing sweetness, which the Londoners called "Indian salt."

It was so pleasing to the occidental palate that the plant from which it was made was brought out of Bengal and cultivated around the world. Today it belts the earth wherever long summers reign and plenty of moisture and soil fertility are found.

For many centuries it was propagated by planting after the fashion of potatoes, short pieces of the upper section of the stalk being put into furrows and covered. This was done so long that practically all of its ability to set seed, like the Irish potato and the horse-radish, was bred out of it.

One day an English physician living on the little island of Trinidad, on the north coast of South America, told a sugar-planter that the grass-like plants coming up here and there in the cane fields were in reality survivals of the time when cane set seed. The planter laughed at him and said they were nothing but stalks of grass.

Both were right, for cane is a grass, and the plants in question did bear seed. From that little observation has grown the improvement of the cane of the world, which has resulted, through the introduction of improved varieties, in billions of pounds of sugar being supplied to man that, under other conditions, could not have been produced.

Cuba has the advantage of every other country in producing sugar cheaply. Most countries have to plant every two years and some of them every season, but the average in Cuba is once in from 7 to 12 years.

THE CUBAN SUGAR SEASON.

In most parts of the island the harvesting season is six months long—from December to June; but in some sections

Photograph by American Photograph Company

CARRYING LEAF TOBACCO FROM THE FIELD TO THE STOREHOUSE

Although there probably have never been as many people in the world suffering from sheer hunger as today, neither has there been such a demand for high-priced cigars as now. Every factory in Cuba is far behind its orders and is begging its customers to buy just as few cigars as possible, in order that there may be enough to go around. Furthermore, the demand is for a much higher grade of goods than was formerly required.

Photograph by American Photograph Company

GATHERING THE MATURE LEAVES IN A CUBAN TOBACCO FIELD

The most famous tobacco in the world grows in the westernmost province of Cuba—Pinar del Rio. The planter frequently gets as much as five thousand dollars an acre for his crop. In order to keep their product uniform, many manufacturers own their own farms and spend fortunes in fertilizers to keep the soil in the condition requisite to meet the most exacting demands for flavor, texture, and yield.

the harvest lasts from the first of December to the first of October. The fields are so planted in the first place that each month of the grinding season produces its own crop of mature cane. Here is a group of fields where the new crop has just sprouted; over yonder another group where the cane is half grown; and on farther is a group where harvesting operations are in full swing.

In harvesting, the cane-cutters first strip the blades from the stalk; then they cut off the upper part of the latter, which is worthless except for replanting, since what juice it contains possesses very little sugar. One of the strange things about sugar-cane is that the sap of the growing plant has little sugar, while in the mature stalk the juice is rich in sucrose. The action of the sun's rays seems to transform glucose into sucrose—a transformation that cannot be accomplished by

human means. If man knew how to do that, every corn-field would be a sugar-field.

The main body of the stalk is cut down and loaded into the ox-carts as shown on page 13. In these it is hauled to the field station and placed in the waiting cars. Each car contains about twenty tons and each train is made up of thirty cars. This makes six hundred tons of cane to the trainload, and eight to ten trainloads a day are required to keep one of the bigger centrals in operation for twenty-four hours. The big United Fruit central, at Preston, requires the crop from 250 acres every day to keep it busy. Imagine a field three-fifths of a mile square being harvested between sun-up and sundown to keep one central going!

WHEN THE CANE REACHES THE MILL

When the cane reaches the mill in the most modern plants, the cars are run, one by one, into a cradle and made fast thereto. A button is pressed and the cradle rocks over on one side. The side of the car swings loose and the load rolls out into a deep trench, at the bottom of which is an endless steel belt.

On this belt the cane is carried up to the crushing rolls. A man stands before a keyboard and by pressing the several electric buttons thereon regulates the flow through the crusher, which disrupts all the little sap cells and releases a great stream of foamy juice, as shown on page 17. Then the crushed cane is sent through sets of rollers, each time under heavy pressure.

Each set of rolls the cane passes through presses it harder than the one before. The last set may exert a pressure of a million pounds, and when the "bagasse," as the crushed cane is called, issues from them it is almost as dry as tinder. It is carried by conveyers to the fire-boxes of the boilers, where it is used as fuel in generating the steam that drives the big mills and boils the cane juice. The stream of crushed cane flows through the last set of rolls at a speed of seven miles a day.

MIXING WHITEWASH WITH CANE JUICE

Imagine big gear-wheels fourteen feet in diameter, with cogs sixteen inches long, three inches deep, and two inches thick on their face. Such are the trains of gears that transmit the power from the engines to the rolls.

After the juice is pressed out of the cane it is thoroughly strained and pumped into big tanks at the top of the building, where a milk-of-lime solution—in other words, plain whitewash—is added.

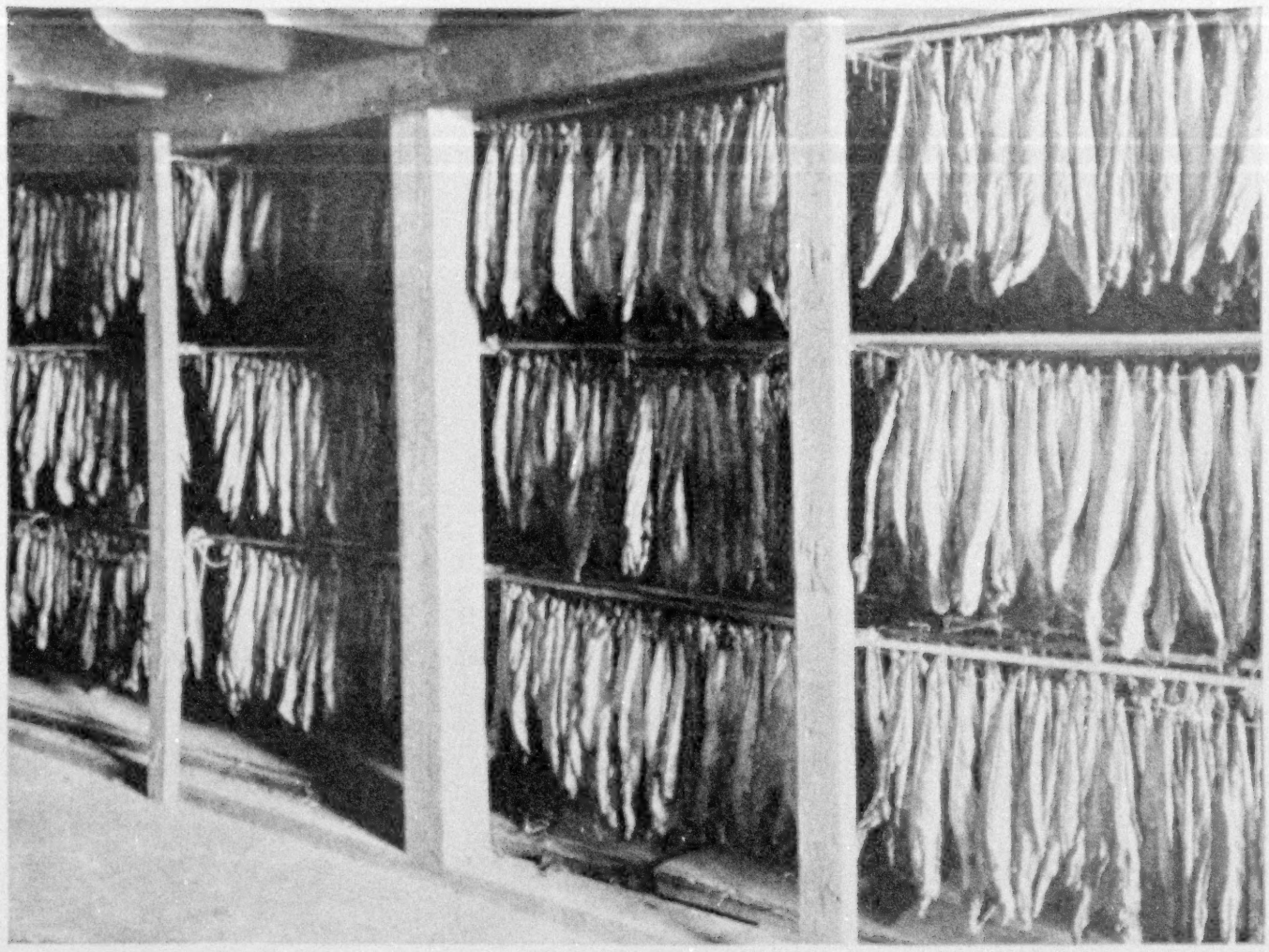
The mixture is then heated to a degree just above the boiling-point. The lime neutralizes the acid in the juice and finds affinities in some of the foreign substances. It pulls these to the bottom and plays the same rôle of purifier in the making of sugar that it plays in the making of iron. The heat causes the other impurities to rise to the surface as scum, so that when this preliminary process is completed in the big settling tanks there is a top layer of froth, a middle layer of clear juice, and a bottom layer of mud-like solid material.

The clear juice is drawn off and passed through filters of excelsior. It is then pumped to the evaporators, where about half of the water is boiled out of it.

HOW THE MODERN EVAPORATOR WORKS

In the more modern factories there is a chain of four evaporators working together. We all learned in our school days that the lighter the air pressure, the lower the temperature at which liquids boil. The sugar manufacturer makes use of that principle in his factory. By means of air pumps he reduces the atmospheric pressure in each evaporator to a point below that of the preceding one.

The steam that boils the juice in the first evaporator must have a temperature of 215° Fahrenheit. When this steam falls below that temperature it passes into the coils of the second evaporator, where the air pressure is so reduced that the partially cooled steam makes the liquid boil at 203°. After it falls below that point the steam passes on to the third evaporator, where, with a still further reduced air pressure, it is able to keep the syrup boiling until it falls below 180°. The fourth evaporator has the air pressure reduced to a practical vacuum. The steam that has lost so much of its heat as to be unable to maintain the boiling-point in the third is nevertheless hot enough to keep the juice boiling in the fourth. Here only 150° of heat is needed



Photograph by American Photograph Company

CURING WRAPPER LEAVES IN A CUBAN TOBACCO BARN

The best Havana cigars are made from tobacco that has undergone a curing process lasting more than two years (see text, page 32).

to maintain the boiling process. By this arrangement the juice is boiled to the proper consistency with only one-fourth of the heat otherwise required.

The next step in the making of sugar is to draw the thick juice into the vacuum pans. Here it comes into contact with hot steam coils and boils at a very low temperature because of the absence of atmospheric pressure. As the boiling proceeds, the sugar crystallizes into small grains. The man in charge of a big vacuum pan is known as the sugar master. From time to time he adds fresh juice, and its sugar gradually settles on the crystals already formed, which thus are made to grow larger.

Finally the vacuum pan becomes full of sugar and mother syrup. The sugar and the adhering syrup are then removed to a centrifugal machine that acts somewhat on the principle of a cream separator. Placed inside a perforated basket and whirled around at from 1,000 to 1,400 revolutions a minute, all of the syrup is forced out through the perforations, while the crystallized sugar remains behind.

This syrup is boiled again, after which it goes to the crystallizer, a huge revolving tank, in which a seed bed of crystals from the vacuum pan has been prepared. There it gradually deposits its sweetness on these crystals, and, when it has given up all that is worth waiting for, the mixture goes back to the centrifugal machines, where its adhering syrup is hurled out from this second lot of crystals. The process is repeated again, and by this time all the available sweetness has been extracted, and the remaining liquor is the "blackstrap" molasses of commerce.

THE PRINCIPLE OF SUGAR EXTRACTION

The principle of producing sugar is embodied in the fact that water can hold only a given amount of sucrose in solution. As the water is driven out of the cane juice the latter finally reaches a stage where there is not enough left to

Photograph by American Photograph Company

SEWING WRAPPER LEAVES TOGETHER PREPARATORY TO HANGING THEM UP TO CURE IN A CUBAN TOBACCO BARN

Before the leaves to be used as wrappers can be cured, the stems of two of them are sewed together, and they are then hung across a lath or string, saddlebag fashion, and placed in the curing barn (see text, page 31).

hold all the sugar dissolved, and as evaporation proceeds, the sugar, deprived of its water, is compelled to pass out of solution into crystal form.

A ton of sugar-cane yields 4½ gallons of blackstrap molasses, and one gets a good impression of the immensity of the industry when, on a single day's rail journey, he meets a dozen solid trains of some forty big tank cars each, and every car full to the dome with blackstrap.

Over every operation in the manufacture of sugar one little instrument presides—the polariscope. It is the court of last resort, the final judge, in the making of sugar. Does this field produce cane rich in sugar? Is that mill extracting its proper percentage of juice out of the crushed cane? Is that juice yielding up its proper share of first-grade sugar? Does any available sugar remain unextracted in the blackstrap? Is this sugar pure enough to meet the importer's tests?

All these questions are put to the polariscope by the mill manager, through the chemist, and it never fails to return a full and convincing answer (see page 22).

What manner of mechanism is this that can thus render these dependable

verdicts, and what strange laws of nature lend it the power it possesses?

To begin with, one must remember that light is a matter of vibrations. According to the physicists who have developed this wonderful instrument and given it the power to guarantee the sweetness that goes into our coffee cup, a ray of bright light is a matter of five hundred trillion vibrations a second. These come at every angle and hence fill up all the space they reach. If these came at the rate of only one a second, a person would have to live two million years to get as much light in his eye as now comes between the ticks of a clock.

THE POLARISCOPE'S TASK

But by a peculiar grouping of lenses and mirrors the scientist is able to strain out all of the crisscross vibrations and use only those which move in a given direction. When these one-direction rays are passed through certain materials they thereby have their direction changed to the right or left. Sugar turns them to the left.

In most polariscopes used in testing, a strong white light passes through a lens and then to a prism made up of two wedge-shaped pieces of Iceland spar cemented together with a film of Canada balsam. This prism excludes all of the crisscross rays, as a paling fence excludes the passage of all wind-blown straws except those that present themselves upright to the openings between the palings. The remaining single-direction rays, or polarized light, pass through the solution which is to be tested and are rotated to the left. They next enter another prism like the first. A pointer attached to thumb-screw is moved as the operator adjusts the prism to correct the rotated rays as they emerge from the sugar solution.

When the operator looks into the eyepiece at the opposite end from the light, he sees a distinct shadow on the lens, one side being light and the other dark, this being due to the inability of the rays to get through the prism until the "paling" of glass is made perpendicular to the "straw" of light. He turns the thumb-screw until the shadow disappears, and then looks to see where the pointer rests on the scale. Its position is the polariscope's answer to his questions.

BAGGING THE BIG CROP OF SWEETNESS

After sugar has come from the centrifugals it goes to the bagging-room, where it is put into bags that hold 325 pounds each. These are hauled in trainloads to the docks and shipped to the United States, where the big refineries remove the impurities and transform the sugar from dirty yellow to immaculate white.

A visit to a big plantation like that at Preston is an impressive experience. It is a small empire within itself, having its own railroad system, its own police department, its own hospital, its own fire department. It covers 280 square miles of territory, possesses a population of nearly ten thousand, and has nearly twelve hundred buildings. Its railroad system has 121 miles of standard-gauge railroad track, 25 standard American locomotives, and nearly 800 railroad cars. About 5,000 oxen are required to haul the cane to the field sidings of the Preston railroad.

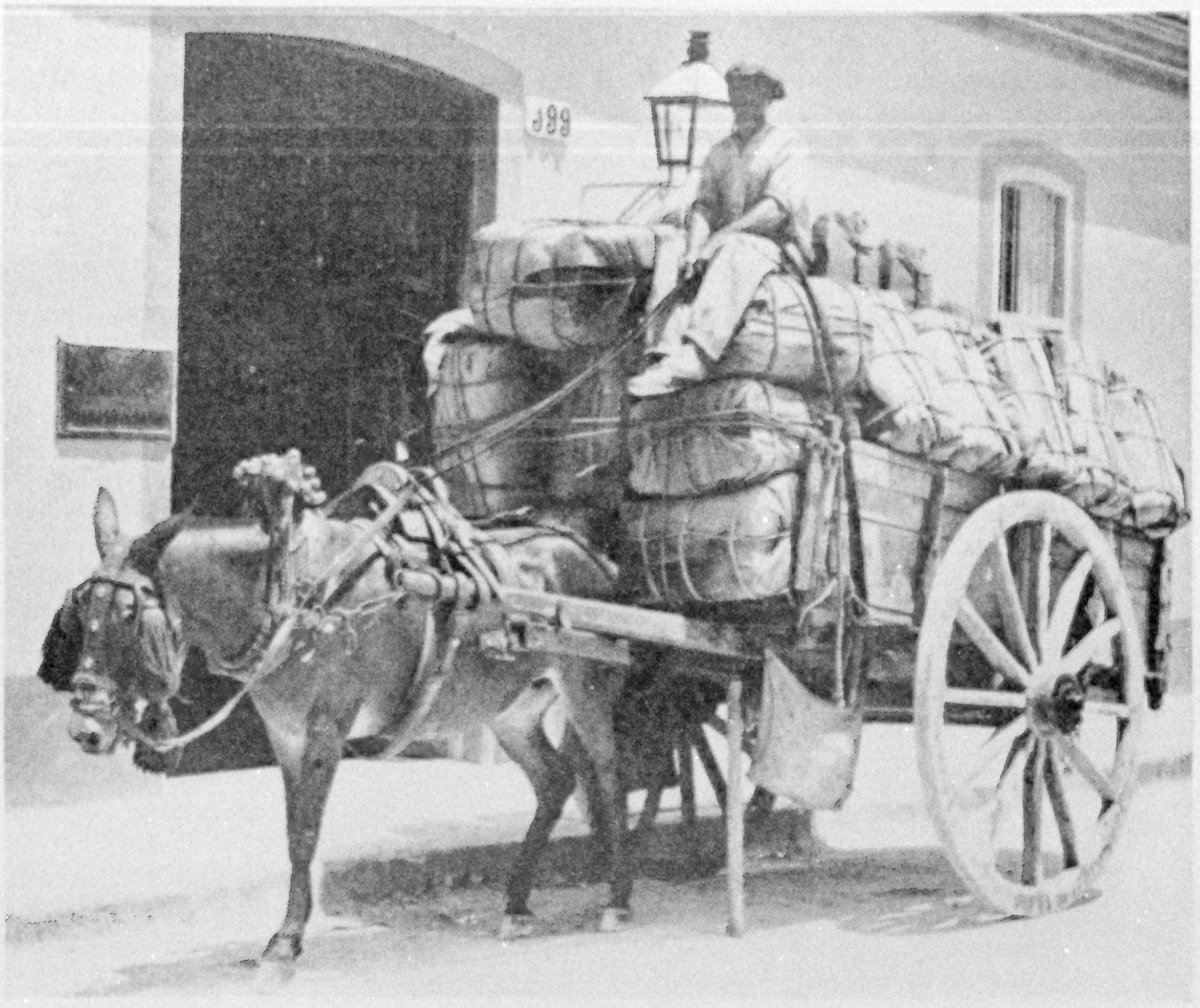
Adjoining it is the Boston plantation, owned by the same company, and together they constitute what is believed to be the largest compact sugar property in the world.

WHERE TOBACCO RULES

Sugar is supreme at the eastern end of the island, but tobacco holds the top position at the western end. Pinar del Rio tobacco soothes the nerves of men of affairs the world over. There are all kinds of tobacco-growers, from the rich "veguero," with scores of acres of the finest Vuelta Abajo wrapper, grown under cheese-cloth, to the poor thatched-hut dweller, with his little patch that produces nothing but cheap filler.

Profits in growing tobacco are proportionate to the care expended in its cultivation. The poor denizen of the low country may get $50 out of his acre, while the rich "vega" of the rolling upland region may bring its owner $5,000 an acre.

The finest tobacco lands in Pinar del Rio are on the south side of the range of mountains that extend through the province from east to west, midway between



Photograph by American Photograph Company

A CART-LOAD OF BALED TOBACCO AS IT COMES INTO THE HAVANA WAREHOUSES FROM THE FARM WHERE IT WAS GROWN

No cart is too humble to be drawn by a mule caparisoned as for a parade. Note the bells on the hames and the tassels suspended from the headstall of the bridle. The Cuban is exceptionally fond of the ornate, whether in language, architecture, or harness.

the Gulf of Mexico and the Caribbean Sea, in a well-watered, rolling country, full of natural beauty and possessed of a climate as mild and sweet as the fragrance of the cigar whose raw material grows there. The soil is chocolate-colored, from two to ten feet deep, and gets its peculiar qualities from the volcanoes that once were active there.

In growing Vuelta Abajo tobacco, seed is taken from the first growth of strong and sturdy plants and placed in plots of virgin soil near the fields. When the seedlings reach a proper state of development they are transplanted in the fields. Fertilizer is selected by chemical analysis of both the soil and the tobacco whose flavor it is desired to reproduce. A mulch of from two to three inches of partly decomposed hay is put over the ground to keep down the weeds and to provide vegetable matter as plant food.

In cutting the tobacco great care is taken that it shall have reached the proper degree of ripeness. Green tobacco produces a harsh, acrid smoke; that which is over-ripe does not work up well in making the cigars; that which the sun "has cooked to a turn" produces a mild, smooth, cool, and fragrant smoke.

TWO YEARS TO CURE HIGH-GRADE LEAF

In curing, the leaves are suspended on poles which are put in racks, first in the sun and then in the curing barns. In the latter they hang for several weeks, their color changing from the green of the growing plant to the brown of the finished cigar.

When this stage of the curing process

Photograph by Walter RuKeyser

DRYING JUTE FIBER AT MATANZAS: CUBA

If the Cuban people were not so busy growing sweets and making "smokes" for the world, they might make fortunes out of fiber production, as the sisal kings of Yucatan have done; for fiber plants thrive like bay trees under the flag of Cuba Libre.

is completed the leaves are put into heaps and left to "sweat" for several days. After that they are placed in bales of about 100 pounds each and shipped to the storage warehouse. There they ferment and undergo a further curing. This process continues from one to two years, according to the grade of the leaves, before they are regarded as fit to be rolled into cigars.

From storage the tobacco goes to the cigar factory. Here the bales are opened up and sprayed with clear water and allowed to stand until each leaf becomes moist and pliable. After this the leaves intended for fillers are placed in hogsheads for further curing, which requires from two to six weeks, depending on the grade of the tobacco.

The wrapper leaves are selected with great care. The cheese-cloth under which they were grown kept out insect enemies and protected them from heavy rains. Any leaf that has a hole through it is retired to the humbler rank of filler material.

The cigar-makers are employed on piece-work basis, getting an agreed sum for every hundred cigars made. Each man is given an allotment of tobacco sufficient to make a given number of finished "smokes." Hundreds of these workmen occupy a single room.

PROFESSIONAL READERS HIRED

In order to get something out of life beyond the mere drudgery of rolling fine cigars for fastidious smokers, the cigar-makers club together and employ a reader. This gentleman is usually a bland sort of fellow, with a musical, soothing voice. He has a little perch about five feet above the heads of the workmen, in the center of the room.

In the morning he reads the daily papers. Then he passes to the comic weeklies, of which Havana has a full quota; from these he turns to the cheap fiction of the

hour—fiction that makes "Dare Devil Dick" seem a "piker."

After the cigars are finished they are placed in old seasoned cedar bins, where they get a little touch of the cedar aroma, while any surplus moisture in them evaporates. When ready for market they are assorted according to the color of the wrapper and packed in the boxes we see at the cigar stands.

Each cigar-maker usually smokes cigars of the grade he makes, and it very often happens that one of these men smokes better cigars than many American millionaires.

The Cuban factories in 1919 produced 157,000,000 cigars for export. Placed end to end, they would reach from the Straits of Magellan to Sitka, Alaska.

The profits of the tobacco and cigar business in Cuba bring in from the outside world a great toll. It is only when considered in comparison with the sugar trade that these profits appear relatively small.

© Underwood and Underwood

HAVANA'S PUBLIC REPOSITORY FOR UNWANTED BABIES: CUBA

This foundling asylum has a door where the mother of the unwanted baby may go in private, place it in a cupboard in the wall, then shut the door. On the other side of the wall a Sister of Mercy opens the cupboard, and the ill-starred child finds a home where loving hearts are open to its misfortune.

There are many other industries which would almost certainly become sources of great wealth to Cuba were there less opportunity of making big money in sugar-growing and tobacco-raising. Cuban sisal might rival that from Yucatan; Cuban cattle might compete with those of Argentina and Australia; Cuban fruits might claim their place in the world's markets alongside those of Florida and California. But the Cuban planter feels that of all men he can best afford to let well enough alone and stick to his two staple crops.

From whatever angle one views Cuba, it is a land filled with interest, a land that in twenty years has passed from gnawing starvation to overflowing plenty. From one of the most wretched of communities to one of the richest of peoples is the transformation that two decades have wrought; and if the island shall be a beacon light, guiding the ships of state of other American nations into the harbor of permanent peace, the altruism of the United States will be justified and external guarantees of internal peace will receive a rich vindication.

THE CHARM OF CAPE BRETON ISLAND

The Most Picturesque Portion of Canada's Maritime Provinces—A Land Rich in Historic Associations, Natural Resources, and Geographic Appeal

By Catherine Dunlop Mackenzie

With Photographs by Gilbert Grosvenor

The Editor of the Geographic Magazine has had the good fortune to spend the better part of twenty summers in Cape Breton Island, and from his personal experience can testify that Miss Mackenzie's account of the merits of this fair island is very conservative. One can search the world in vain for lovelier or happier scenes than meet one everywhere throughout romantic Cape Breton.

"CAPE BRETON an island? Ha! Are you sure of that? Show it to me on the map. So it is! My dear sir, you always bring us good news. I must go and tell the King that Cape Breton is an island!"

Smollett does not tell us whether it was after he had rejoiced his sovereign with this news that the Duke of Newcastle made his historic statement, "If France was master of Portsmouth, I would hang the man who should give up Cape Breton in exchange for it."

But perhaps it was this glance at the map that influenced England's policy when, at the end of the Seven Years' War, France offered to waive her claim to the whole of Canada in return for the single possession of Cape Breton Island. England refused, and negotiations for peace were broken off.

Although a British possession from the time of the Cabots, it was the French who as a government first valued Cape Breton as a "nursery for her seamen," and a French writer of the seventeenth century who calls it "a very beautiful island on the coast of Acadie, where there are plains and prairies, vast forests filled with oak, maple, cedar, walnut, and the finest fir trees in the world"!

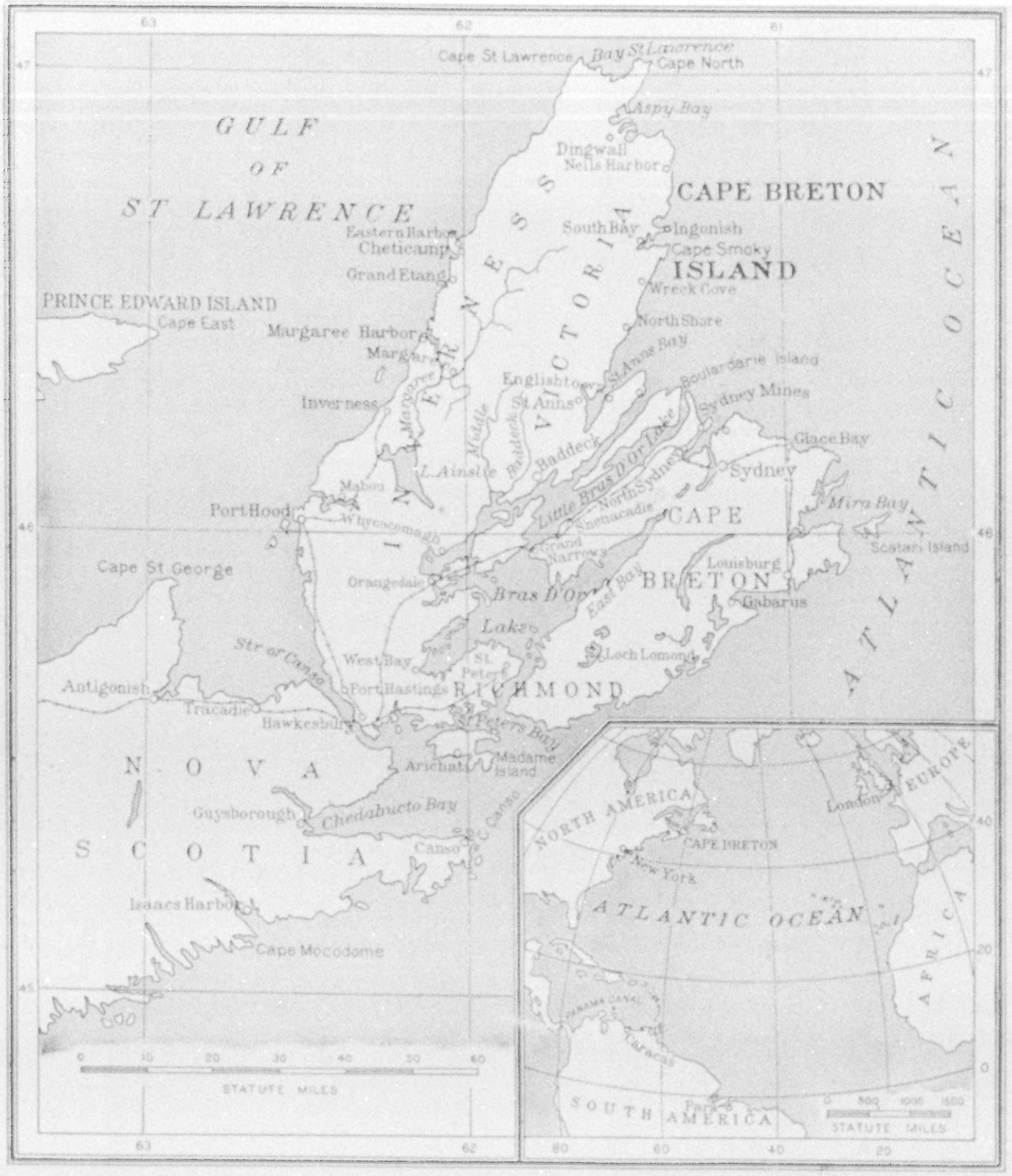
BASQUE SEAFARERS NAMED CAPE BRETON

The island, 110 miles long by 87 miles wide, forms the northeastern part of the Province of Nova Scotia, with which it shares identification as Lief Ericson's "Markland." Undoubtedly her coasts were frequented by Norwegian rovers as early as the tenth century, and we even have it on the authority of the Flemish geographers that the island was discovered and named by Basque fishermen, who crossed the Atlantic in pursuit of whales a hundred years before the voyages of Columbus.

Whether or not one credits them with so early a discovery, it is undoubtedly to the seafarers of the Basque provinces that Cape Breton owes her name—perhaps the oldest name in North American geography.

It is from the voyages of the Cabots, however, that Cape Breton dates her history. The highland to the north of the island is now generally agreed to have been the landfall of John Cabot—the first sighting of North America of which we have record. Peter Martyr's account of the voyage of the younger Cabot in 1498, when the island was claimed in the name of "Kyng Henry," shows that a landing was made on these northern shores at least a year before Columbus touched upon the mainland of the continent.

Standing far out in the Atlantic, the most easterly extremity of the Dominion of Canada, Cape Breton owes much of her colorful history to her geographical position. Of all the ports on the Atlantic seaboard, hers are the nearest to the shipping centers of Europe and Africa by hundreds of miles. She reaches out into the ocean trade lanes, the landfall of west-bound shipping today as in the time of the Cabots, and as rich in the promise



Drawn by A. H. Bumstead

A MAP OF CAPE BRETON ISLAND

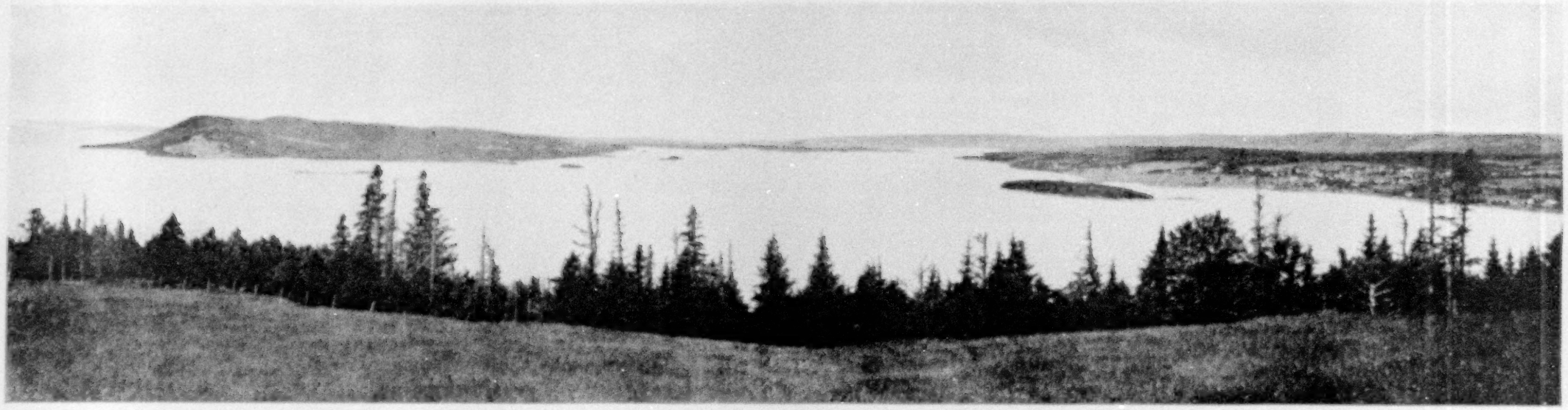
Of all the ports on the Atlantic seaboard, Cape Breton's are the nearest to the shipping centers of Europe and Africa. Owing to the island's easterly projection, its ports are also nearer those of South America than others on the North Atlantic coast (note small inset map).

of a great commercial future as in the heritage of an historic past.

CAPE BRETON'S HISTORY IS WAR HISTORY

Two centuries ago her commanding position with reference to the trade of the St. Lawrence and the West Indies made Cape Breton an issue in world politics, an issue sometimes disturbing the peace of Europe and upsetting the treaties of the Powers—"the few acres of snow" for which, according to Voltaire, France and England made piratical war.

The fortunes of the little island, now under the red cross of St. George, now under the golden lilies of France, are a part of the continent's history—the greater part of it a war history.



VIEW OF BRAS D'OR LAKES FROM THE TOP OF BEINN BHREAGH

Baddeck appears on the right. These lakes freeze over in winter and it was here, over the ice of Baddeck Bay, that J. A. D. McCurdy, a Cape Bretoner, made the first flight in a heavier-than-air machine in the British Empire, February 23, 1909 (see page 50)

PANORAMA OF BADDECK, CAPE BRETON

This quaint capital of Victoria County has the most beautiful natural surroundings of any summer resort in Cape Breton. The long headland on the left is Beinn Bhreagh (Beautiful Mountain), the summer home of Alexander Graham Bell and the scene of many experiments on land, air, and water.

Since 1914 the utilization of that strategic position that once made her mistress of these northern seas has given Cape Breton a new chapter of war history—a fascinating chapter, with its pageant of transport and convoy and patrol, and back of it the great war effort of her people.

And now, in the new warfare of commerce, is coming the fulfillment of that promise which her unique geography has held from the first.

THE RESORT OF ADVENTURERS IN THE FIFTEENTH CENTURY

From the close of the fifteenth century until it came into French hands, after the Treaty of Utrecht, the island was the resort of the adventurers of all Europe—French and English, Spanish, Dutch, and Portuguese, attracted by the great wealth of the coast fisheries and by the valuable trade in furs with the native Micmacs.

Before the close of Elizabeth's reign, more than 200 English vessels were employed in the fisheries off Cape Breton coasts. Cape Breton ports were neutral anchorage for the shipping of the warring European powers, her peaceful bays harbored privateer and frigate of war alike, and there is a gay note of lace ruff and jeweled sword against the stormy background of the times.

By the Treaty of Utrecht the island was ceded to France, as the key to her colonies on the St. Lawrence and her rich inland territory south of the Great Lakes. England then held the whole Atlantic seaboard, from Hudson Bay to Florida, and her rival was not slow to see the advantage gained in this one exception.

Strong fortifications were decided upon for Cape Breton, which was renamed "Isle Royale," and the site on the English harbor, chosen for the "Dunkirk of America," became Louisbourg, in honor of the reigning Louis XIV.

THE ROMANTIC STORY OF LOUISBURG

The story of Louisburg, a fortress 25 years in the building, at a cost of six millions of dollars—more than four times that sum in the value of our money—its two sieges, and its final demolition, is the best-known chapter of Cape Breton's history.

Perhaps in the annals of the New World there is no story so romantic as that of a city, ramparted and bastioned and bristling with cannon, sheltering the lives of thousands of souls, with its imposing public buildings, its cathedral, convent, and hospital, its theater, and even its brewery, springing up on the shores of this far-off island in the North Atlantic—an island almost unexplored and inhabited by savages not always friendly, and for half a century remaining a challenge and a menace to the neighboring colonies of a rival power.

The fortress became not only the base of French naval power in America, but, with outlying posts at St. Peters, Ingonish, and St. Anns, the resort of privateers that infested the New England coast and the haven to which they conveyed their spoils.

Upon the outbreak of war between France and England, in 1744, it may be imagined that to the colonists of Massachusetts and New Hampshire the reduction of this stronghold of His Most Christian Majesty was a highly attractive project.

A SIEGE THAT FORESHADOWED THE AMERICAN REVOLUTION

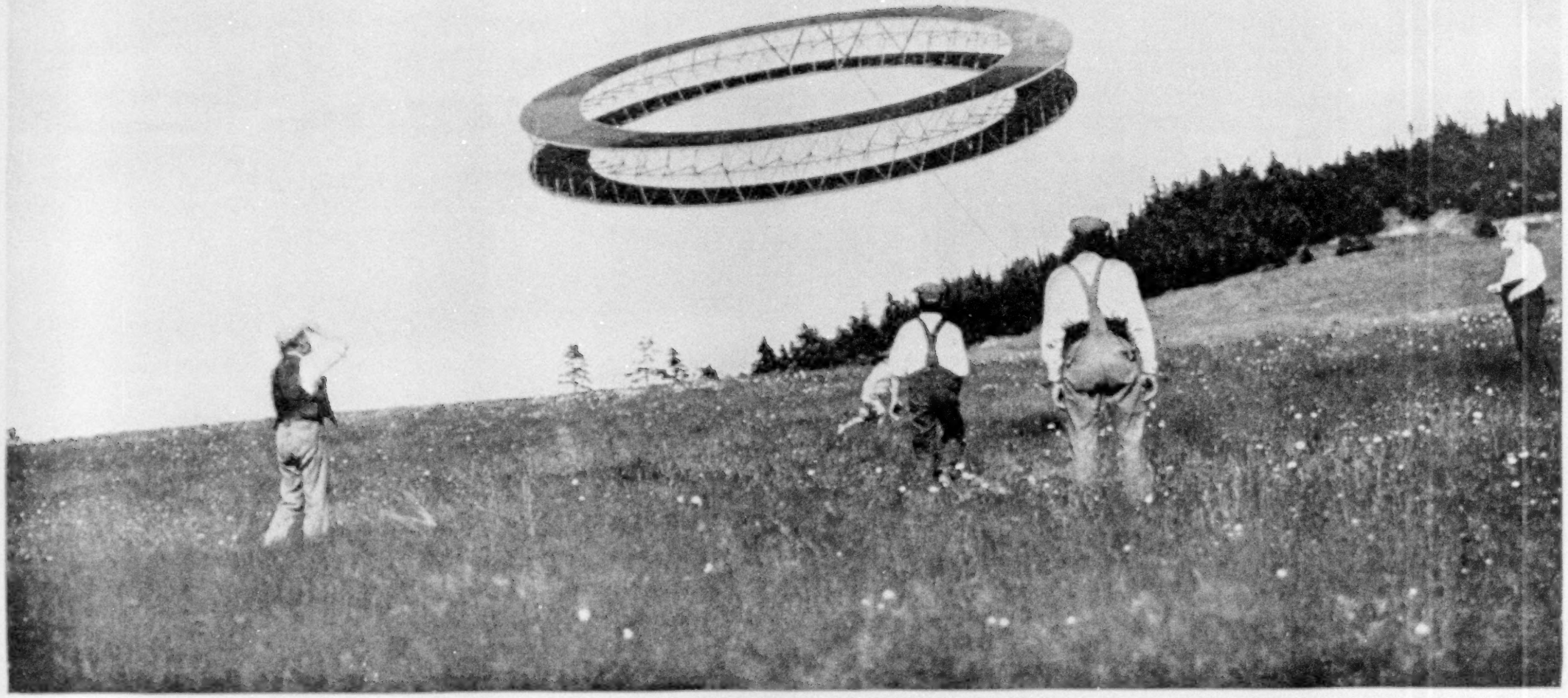
The first siege and capture of Louisburg by the little band of New England militiamen under Pepperell, with the British West India fleet under Warren, probably foreshadowed the American Revolution. Of these intrepid colonists one historian says:

"Their expedition against Cape Breton was their first national enterprise and its result their first national triumph, and it presaged greater things. There were not wanting those who saw in the downfall of Louisburg the independence of the American colonies. . . . The dormant idea of national separation was fanned into flame before the walls of Louisburg."

On the surface, however, it was purely a British exploit to "curb the haughtiness of France."

There were military honors and a title for Pepperell; and New York and Philadelphia and Boston rang loyally with:

> "A glorious peace we shall have soon
> For we have conquered Cape Breton,
> With a fa, la, la," etc.



A PIONEER IN AVIATION DIRECTING THE FLIGHT OF A NOVEL KITE: CAPE BRETON

During Dr. Bell's experiments with kites, extending through many years, almost every conceivable shape and design was employed. This photograph shows an immense circular kite, built of tetrahedral kites, about to soar several hundred yards aloft.

to the accompaniment of bell-ringing and bonfires and tubs of punch.

The descendants of these enthusiastic citizens, the Society of Colonial Wars, have erected a granite shaft to the heroic dead of this enterprise, and it stands on the spot where Pepperell, in the presence of the assembled troops, received from the military governor the keys of this "most splendid city of La Nouvelle France."

All England celebrated the victory; there were illuminations and the firing of salutes, and the captured colors of the fortress were deposited with much pomp in St. Paul's Cathedral.

With the closing of this refuge of Atlantic privateers, "marine insurance on Anglo-American vessels fell at once from 30 to 12 per cent"!

GALLANTRIES IN TIME OF WAR

Subsequently the island was restored to France—as much a cause for irritation to New England, and perhaps more justly so, than that which precipitated a tea-party better known. And again the fortunes of war and the final supremacy of Anglo-Saxon arms in the New World made it permanently a British possession.

The giant fortress of Louisburg was demolished in favor of the newly fortified base at Halifax—a military necessity that is deplored by the visitor of today.

And yet, in all its desolation, one thrills to the glory of its past. Here are the remains of the Dauphin's gate; yonder can be traced the bomb-proof casements of the King's Bastion, and on one of these grassy mounds stood the citadel, where fair ladies and gallant gentlemen of France graced the grand ball on that fateful eve of Pepperell's arrival in Gabarus Bay.

Perhaps behind this very rampart the lovely Madame Drucour encouraged the defenders in the second siege by serving their guns with her own hands—the fair enemy who so won the admiration of the British admiral that he sent her a special message complimenting her upon her bravery. It is a pretty story and we are glad that Madame accepted the Admiral's compliments and the West Indian pineapples which accompanied them, and graciously returned him a basket of French wines for his wounded.

THE ADVENT OF SCOTTISH SETTLERS

For some years after the peace concluding the Seven Years' War, which confirmed England's ownership of Cape Breton, the policy of her government in reserving the island for naval purposes retarded its colonization. Not until 1784, when the island became temporarily a separate colony, with its own governor, were grants of land to settlers permitted.

Thus Cape Breton received fewer of the United Empire Loyalists, who maintained their allegiance to the British Crown at the expense of their lands and homes in the thirteen American colonies, than did the adjacent provinces, and had room for a greater number of the hardy Scottish settlers who came in the late years of the eighteenth and the opening of the nineteenth century.

Many of these came out to join relatives and friends among the Highland soldiers who had fought under Wolfe at the second siege of Louisburg and who had remained in the country upon the disbanding of their regiments, while others came in the stream of emigration which had its source in the breaking up of the clan system and the agrarian troubles in the Scottish Highlands after the suppression of "the '45" and the disaster of Culloden Moor.

In this way the island became "as Gaelic as the most Gaelic part of Scotland." Though there are considerable French Acadian settlements, a more or less cosmopolitan population in the vicinity of the mining districts, and many descendants of the fine old United Empire Loyalist stock, the F. F. V.'s of the provinces, Cape Breton is still predominantly Highland Scottish in its population.

Here can be heard the old Celtic tongue that hurled defiance at Cæsar from the shores of Britain two thousand years ago—a tongue that has sounded the slogan of the Highland clans on every battlefield of the Empire; "a

speech that fits the Highlander's mouth to a nicety, that becomes him like his kilt and bonnet; a speech that readily sounds a note of war and just as readily suits itself to devotional purposes; it is adapted to a fine, long grace before meat or to a lusty war-cry that startles the very eagles in their eyries."

BRED TO HARDSHIPS AND DANGERS

In the north and west of the island in particular these hardy mountaineers and islesmen found much to remind them of their native hills and glens and sea-girt coasts. Bred to the hardships and dangers of warfare through all their history, they were peculiarly fitted to endure the privations of pioneer life in this northern wilderness. They were pitifully unskilled in the use of the axe and the plow and unprepared for the cold of winter, yet they endured where almost any other people would have perished.

In their descendants the same qualities of fearlessness and unswerving purpose are leaving their impress upon the citizenship of the American States and the western provinces, whither the youth of Cape Breton are flocking yearly.

This seeking of wider opportunities by her most enterprising sons and daughters is a serious loss to Cape Breton and a problem which it is hoped a greater commercial development of the island will solve.

They can be found occupying positions of trust in profession and trade alike: whether in lumber or mining camp, before the mast or on the bridge, on both seaboards and the Great Lakes, in the university, in law or medicine, or in the Church—they are Cape Bretoners all, coheirs of that "dash of poetry, a touch of genius that belongs of the same fine quality, to no other people."

THE CAPE BRETONER AS A SOLDIER

In speaking of the appearance of the Canadian troops in the late war, Lord Northcliffe said: "Many are of a great stature, especially the Scotsmen from Nova Scotia and New Brunswick and Cape Breton—some of the descendants of the disbanded Highland regiments of long ago."

Another writer, more enthusiastic than accurate, calls them "a race of men physically the superior of any other on the face of this continent." "They are chiefly of Highland Scottish descent with a sprinkling of French Canadians and, as a matter of course, nearly all Roman Catholics in their religious belief."

His observations of the Highlanders was apparently confined to the stalwart descendants of the Barra Islemen, devout sons of the Church. Had he penetrated far, in Victoria County for instance, he would have breathed the atmosphere of Calvin's five points, where the open-air sacraments of the Scottish Covenanters are still held, with services in English and Gaelic. There are still old people who speak no other tongue than their native Gaelic and many who are more at home in it than in the speech of the Sassenach.

Hundreds of Cape Bretoners fought in the American Civil War. There are veterans still living on remote Cape Breton farms who can tell of walking all the way to Maine to enlist. Her sons followed the Empire's call on South African kopje and veldt; and since 1914, out of a population of approximately 122,000 men women, and children, Cape Breton contributed 13,000 volunteers to the Canadian forces.

Large as the proportion is, it represents, after all, only a fraction of the island's contribution, for the honor roll of the Great War contains the names of hundreds of her sons who enlisted in other provinces and the United States. And there were no better soldiers on any front.

One Cape Breton Highlander, a bronzed, kilted giant who might have sped the fiery cross in "the '15" or "the '45," told of an informal presentation to an officer of the Allied High Command:

"Ah!" said he, "you are from Canada? I don't know much about Canada, except that there is a place there called Cape Breton, and the men are born fighters."

From the second battle of Ypres, where a Cape Breton company first won distinction in this war, to the undying glory that was theirs at Vimy Ridge and

A GROUP OF ALEXANDER GRAHAM BELL'S TWIN-BEARING SHEEP; CAPE BRETON

DR. BELL AND HIS TALENTED WIFE, MABEL GARDINER BELL, DISCUSSING SCIENTIFIC PROBLEMS BETWEEN EXPERIMENTS AT BADDECK

Passchendaele, and the breaking of the Queant-Drocourt line, these men have indeed "stood a wall of fire around their much-loved isle."

And when the victorious Canadians marched into Mons in the dawn of that historic November morning, it was the pipers of that most Cape Breton of all units, the 85th Nova Scotia Highlanders, that skirled on ahead to "Bonny Blue Bonnets Are Over the Border."

But Cape Breton's army was not exclusively Gaelic in its personnel. There are English and Irish and Welsh and Lowland Scottish names—men from the mining districts* and French Acadians from the settlements of the West Coast and Richmond County, where the French of Louis XIV is still spoken. These were some of the men who took back to France the folk-songs brought over the seas by their ancestors two and three centuries ago.

Sometimes, as they passed singing through the French villages, old inhabitants came out to hear almost forgotten "chansons" of their youth on the lips of these kinsmen from overseas.

There were Cape Breton medical officers and nursing sisters on every front, whether serving with Canadian, or Imperial, or American units. And back of this record of active service stood the people of the island.

It is not too much to say that Canada's output of munitions was dependent upon Cape Breton steel and Cape Breton coal which means Cape Breton workmen. In the little city of Sydney and the county of which it is the shire-town, the sum of $12,000,000 was subscribed in one year for war needs; and this from a population of less than 100,000, none of them citizens of great wealth.

And as great as these contributions, which can be reckoned in dollars, were the untiring efforts of Cape Breton women to provide for every need of the men overseas. In town and village and in the remotest country districts alike there were mothers, and wives and daughters, and sisters of Cape Breton soldiers spinning and knitting for their comfort—and waiting, too often in vain, for their return.

* It is said that the mining town of New Waterford sent more men overseas in proportion to its population than any other town in the British Empire.

CAPE BRETON'S WEALTH IN COAL

Commercially, Cape Breton is best known for the wealth of her enormous coal deposits and for her growing steel industry. The first regular mining of Cape Breton coal appears to have been for the supply of the fortress of Louisburg, though there is earlier mention of its use, and in a report to the British Admiralty in 1711 Admiral Walker says:

"The island has always in time of peace been used in common, both by the English and the French, for loading coals, which are extraordinarily good here, and taken out of the cliffs with iron bars only and no other labour."

As fuel, it continues to be "extraordinarily good," and in 1918 the island's production was 4,585,110 net tons.

There are three distinct coal fields,—the Sydney, the Inverness, and the Richmond—the importance of the first overshadowing the others, though in themselves of considerable value. The Sydney field, with its estimated deposit of one thousand million tons (exclusive of seams less than four feet thick), is probably the most valuable in the Dominion.

The land area of this field forms merely the southern extremity of a vast deposit extending far out under the Atlantic—submarine areas that are already being worked two miles from shore.

The value of these coal areas is enhanced twofold by the shipping advantages of Sydney and Louisburg harbors and it is significant that these ports are nearer not only to European and African markets, but, by reason of the island's easterly projection, nearer to those of South America than any other ports on the North Atlantic seaboard (see map, page 35).

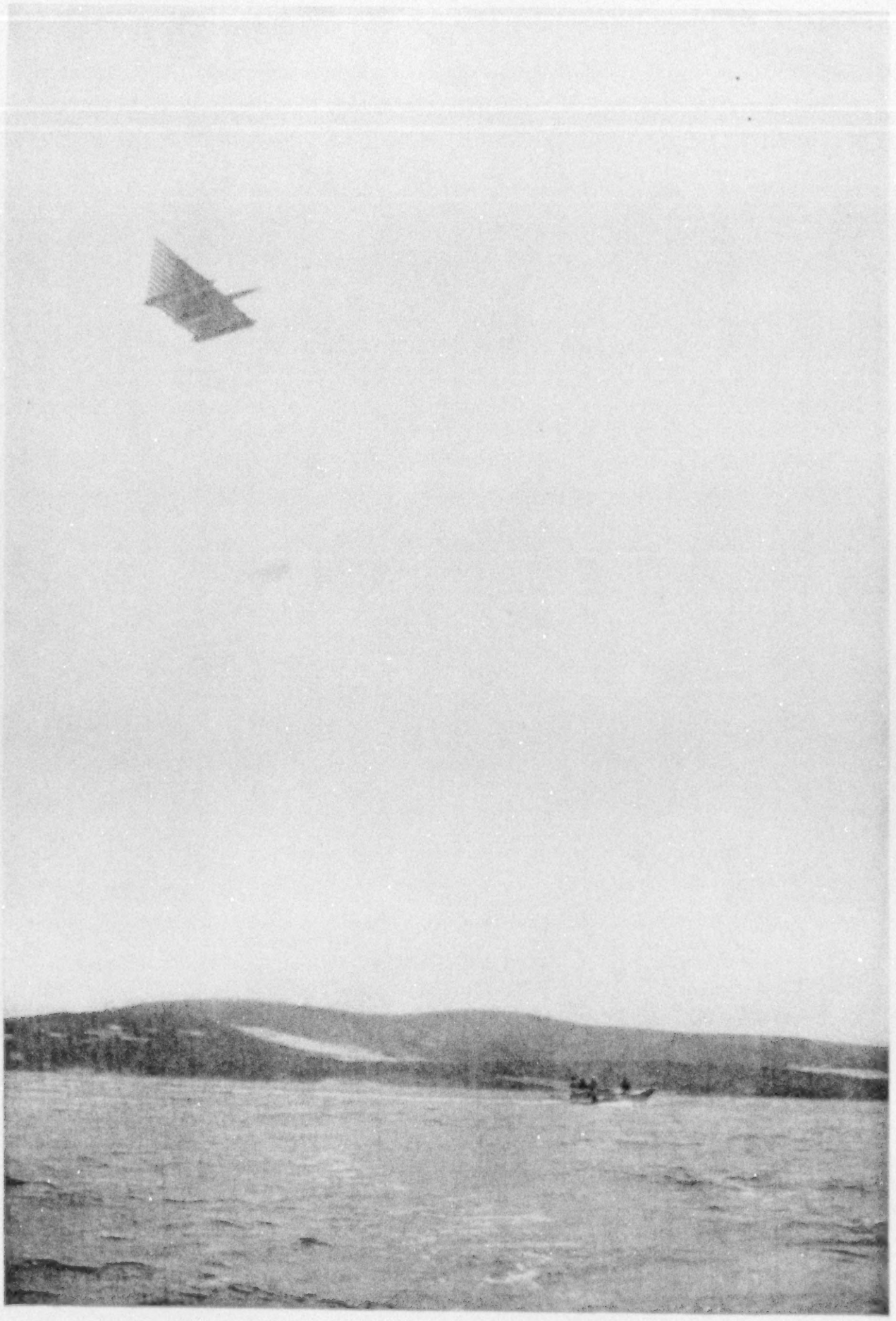
The shipping of Louisburg and Sydney is within shorter sailing distance of Rio de Janeiro than that of New Orleans.

THE ONLY "COAL AT TIDE-WATER"

Cape Breton coal is of the bituminous variety, especially useful in the manufac-

THE TOWER ON THE SUMMIT OF BEINN BHREAGH

This outlook tower, unique in design and construction, was recently erected by Dr. Alexander Graham Bell, at his summer home in Baddeck, Cape Breton. The tower reaches a height of nearly eighty feet, and yet neither scaffolding nor derricks were employed in building it. It is made of the tetrahedral cells invented by Dr. Bell. This considerable structure weighs less than five tons, and yet can carry a great weight. It is remarkable, not only for its strength and lightness, as well as cheapness, but also for the fact that it was put together in about ten days by several unskilled laborers, and that every part of the work was done on the ground. No one was obliged to leave the ground until the tower stood erect and completed.



DR. BELL'S MAN-LIFTING KITE FLYING OVER BRAS D'OR LAKE (SEE PAGE 49)

This is the giant Cygnet No. 1, in which Lieutenant Thomas E. Selfridge, U. S. Army, made an ascent 168 feet above the waters of the Bras d'Or Lake thirteen years ago.

HAULING DOWN ONE OF DR. BELL'S LARGER KITES: CAPE BRETON

It is no easy matter to bring down one of these sturdy flyers when the wind is blowing hard.

ture of gas, with all the consequent by-product possibilities.

In the good old days when coal could be had for a shilling or so a ton, the womenfolk of the miners at one of the Sydney workings used to provide hot water for the weekly wash by the simple practice of digging a hole ten or twelve inches deep at the water's edge, filling it with pebbles and setting a candle to it. By this means they had plenty of boiling water, and the supply continued for weeks or months unless the fire was extinguished.

This incident has been quoted in a government report to illustrate the high percentage of gas. No estimate is given of the cost of the hot water at present prices of coal, but it is surely proof of Sydney's claim to coal "at tide-water"—the only coal at tide-water on the Atlantic seaboard.

With this unlimited supply of fuel suitable for coke, limestone in abundance, and iron ore near at hand, Cape Breton has the three requisite raw materials for that "cheapest ton of steel" which Andrew Carnegie has said assured a nation supremacy.

But, above all, Cape Breton's commercial advantage lies in her facilities for water transport. All other important iron-producing districts of the continent are far inland. Cape Breton's maritime position relieves her industry of the burden of railway freight hauls for raw material and gives her a corresponding advantage over inland competitors in delivery of the finished product to foreign markets.

In 1918 the island produced 512,377 net tons of steel ingots and 415,808 net tons of pig-iron. Figures of the actual production of war material by the Sydney industries are not yet available, but they may be estimated from the fact that an army of 16,000 men was employed in the steel plant and collieries through more than four years of war, working night and day, the products ranging from steel rails, shell blanks, and barbed wire to chemicals for the manufacture of high explosives. During the war 705,000 gallons of toluene were manufactured in Cape Breton.

Due to their part in the making of steel, the island's rich deposits of limestone and dolomite are, next to coal, the most extensively developed of her mineral resources. The production of limestone alone, for 1918, was considerably more than 400,000 tons. The largest areas are operated by the corporations controlling the Sydney industries and all of them are near the invaluable water transport which the Bras d'Or Lakes afford.

The city of Sydney shares with the towns of North Sydney and Sydney Mines, across the harbor, one of the finest ports in North America. It was founded as the capital of the island when Cape Breton was a separate province, and was a garrison town up to the time of the Crimean War.

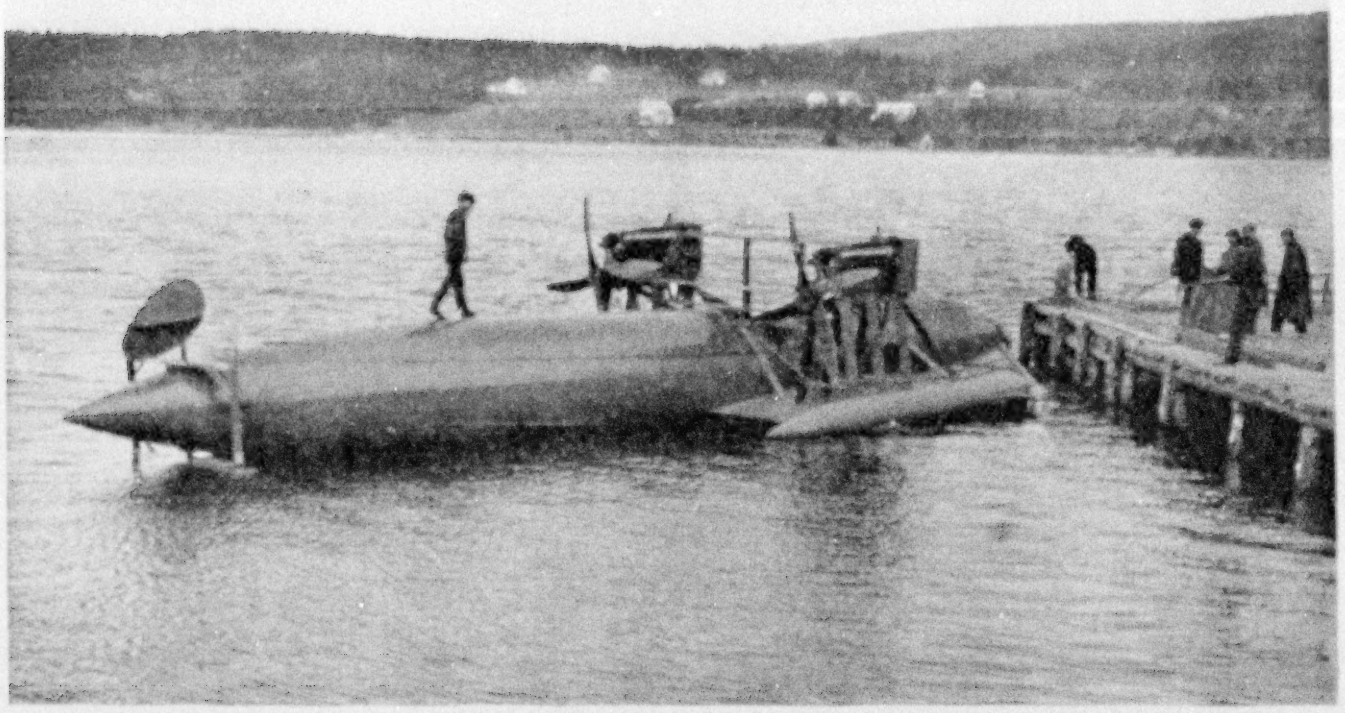
Though its founding completed Louisburg's ruin, it never in any way approached the military importance of that fortress. But it has a military heritage of some well-laid streets, and its park is outside the town because, so the story goes, one of the military governors lost the title to the original site at a poker game.

Sydney's coal and steel industries are rapidly making it a great commercial center, and it has now a five-million-dollar ship-plate rolling mill, which presages steel shipbuilding on its own waterfront with its own steel.

NORSEMEN CAME TO THE ISLAND FOR TIMBER

In earlier times the whole island was well wooded with hemlock, oak, ash, birch, elm, maple, beech, and pine, as well as the spruce and fir now predominant. The Norsemen came here for timber, and within a generation the craft of the Clyde shipbuilders loading lumber were familiar in Bras d'Or waters.

Forest fires have depleted the finest areas, and the export has largely fallen off, but in 1918 the Cape Breton collieries used nearly 12,000,000 lineal feet of pit timber, most of it produced on the island. The wood-pulp industry is a source of large revenue and one in which much American capital has been invested.



DR. BELL'S HD-4 AT REST: CAPE BRETON (SEE ALSO PAGES 48 AND 49)

Next in importance to Cape Breton's mineral wealth are her fisheries. The cod, the ancestor of North American exports, has formed the principal catch of these waters since Sebastian Cabot reported them in such numbers as to impede the navigation of his ships, and Charlevoix asserted the fishery of more value to France than the mines of Peru and Mexico. Cape Breton fishermen took a toll of nearly $4,000,000 from the coast waters of the island in 1918.

The salmon and trout fishing of the streams is well known the continent over and the tuna fishing at St. Anns Bay attracts sportsmen yearly (see page 51).

THREE GREAT NAMES ASSOCIATED WITH CAPE BRETON

It is singular that Cape Breton should be associated with the work of the three men who have done most to make neighbors of the nations—Morse, Bell, and Marconi.

It was on Cape Breton shores, at Cape North, that the first successful Atlantic cable was landed in 1867; and for years through the lonely North country of the island, ran the land line of the cable company—the slender link between continents that united two civilizations.

One of the biggest problems of the company's superintendent was to prevent the interruption of world news by the marksmanship of young Cape Breton, who, heedless of tidings of the rise and fall of empires, found the wire a novel target.

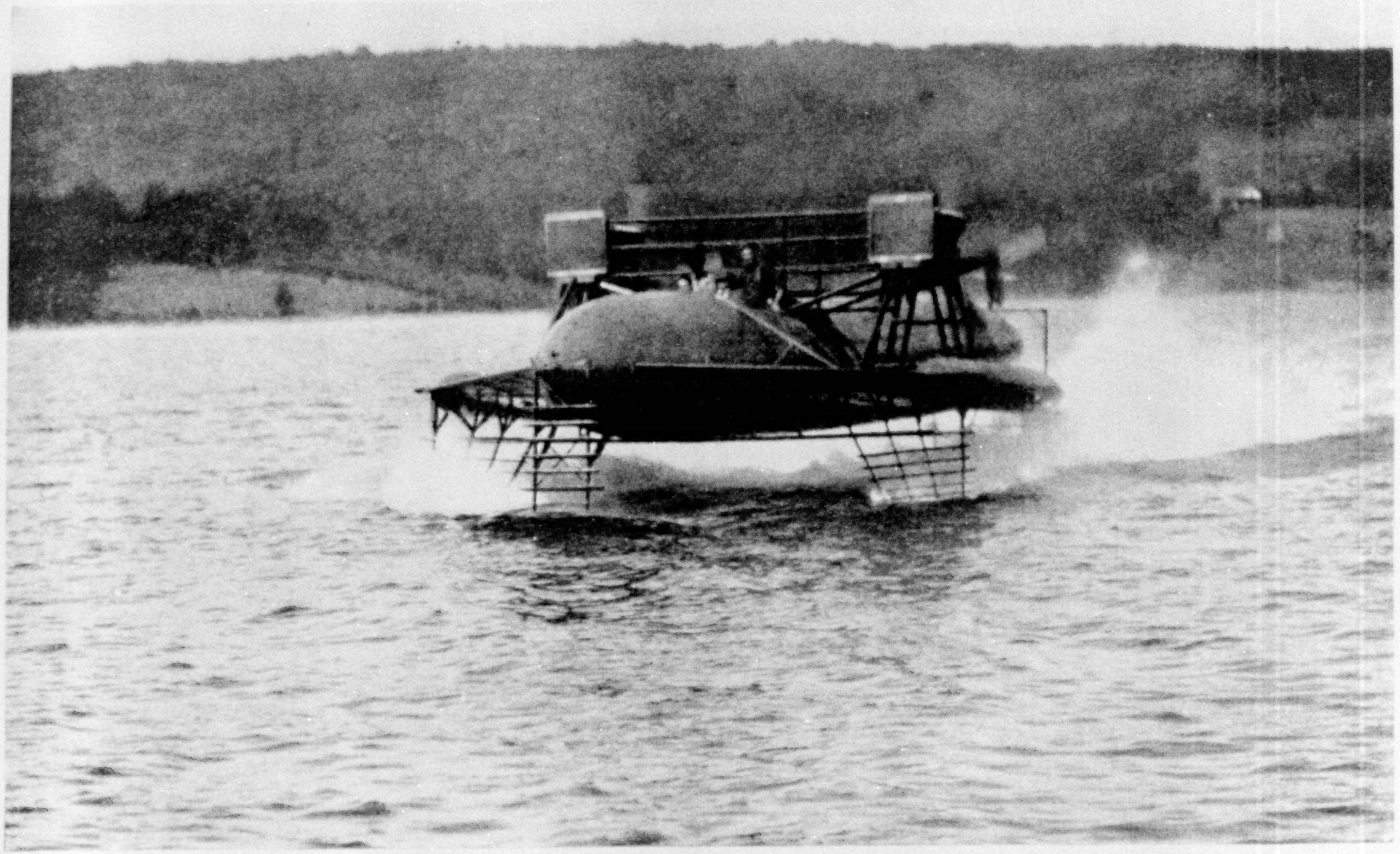
"BEINN BHREAGH" A CENTER OF SCIENTIFIC EXPERIMENT

The laboratories of Alexander Graham Bell at his estate, "Beinn Bhreagh" (Beautiful Mountain), near Baddeck, have been for nearly thirty-five years the center of the great scientist's work of research and experiment in subjects ranging all the way from aërial locomotion to the breeding of a multi-nippled, twin-bearing stock of sheep.

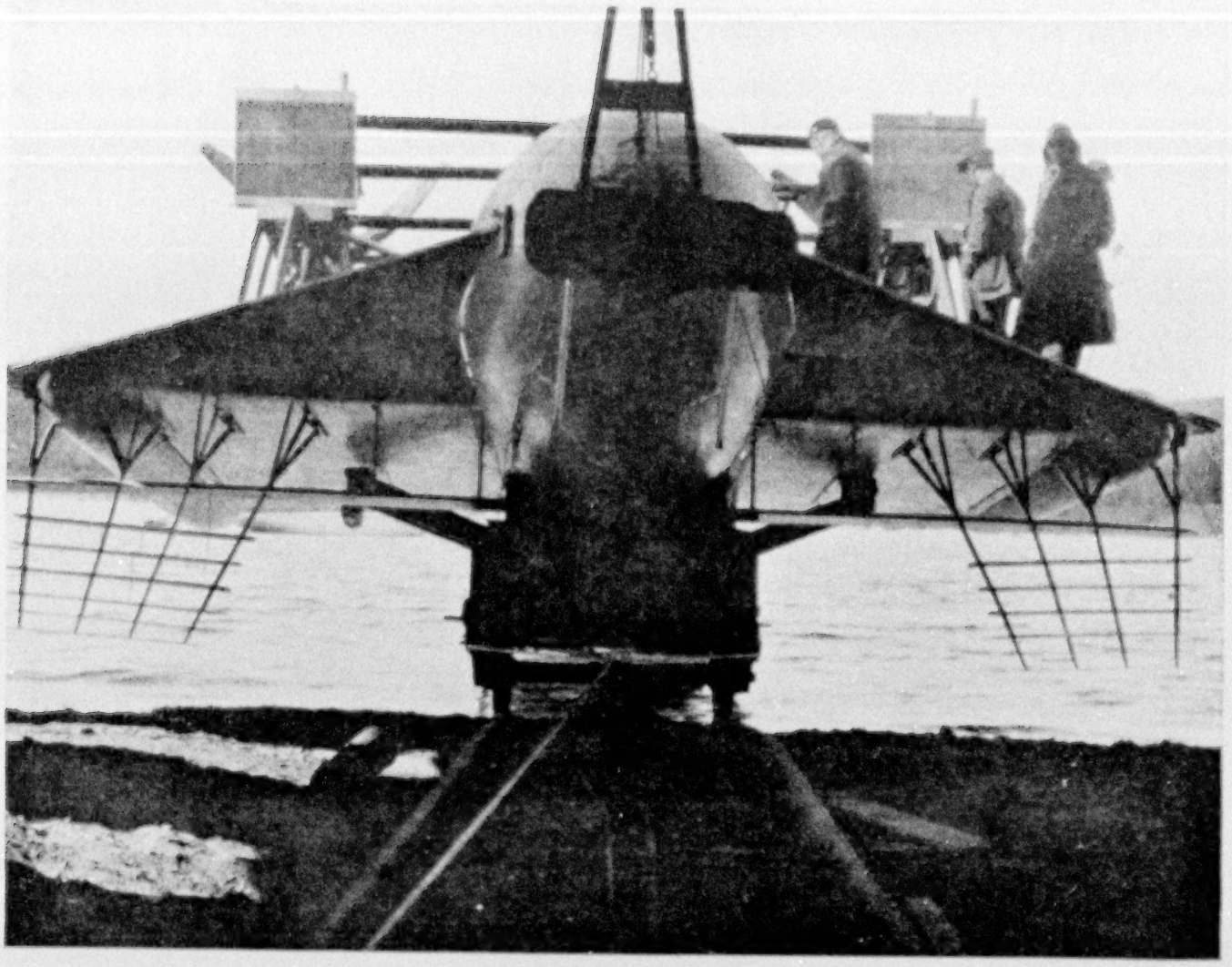
Dr. Bell's work is of special interest to the members of the National Geographic Society, of which he was the second president and a member of its Board of Trustees since its founding.

Preserved in the laboratory museum is one of the first commercial graphophones (a phonograph as well, for it both recorded sound and reproduced it), which Graham Bell used here in his experiments in multiplying phonograph records by means of printing from molds of plaster and agate cement. A collection of these molds is another exhibit.

These Cape Breton experiments with the graphophone followed Dr. Bell's work with his associates of the Volta Labora-



THE FASTEST BOAT IN THE WORLD, MAKING 70 MILES AN HOUR: DR. BELL'S HD-4 IN ACTION. (SEE PAGE 49)



HAULING THE HD-4 INTO HER HOUSE

The illustration shows very clearly the two sets of hydrofoils (resembling ladders), on which the boat rises from the water as she gathers speed. The faster she goes the higher she rises from the water, until she is supported solely by the lowest blades, as is very graphically shown on page 48.

tory, which resulted in the flat disk record, with its "sound-reproducing, laterally undulating groove in a wax-like tablet" that is universally used today. The Beinn Bhreagh Laboratory did not share in this work; it was not in existence then; so the flat disk "phonographs," as Dr. Bell called those first records, are in the National Museum at Washington, instead of in the little one at Beinn Bhreagh.

But there is a fascinating collection of apparatus similar to that used in the development of the photophone; there are models of the giant man-carrying kites of tetrahedral-cell construction which preceded Graham Bell's work in the heavier-than-air flying machine, and a whole series of models of aërial propellers tested out here in the infancy of the modern flying-machine.

From his boyhood Graham Bell had believed in mechanical flight, and he was working on kite structures when Samuel Pierpont Langley visited him in Cape Breton in 1894. It was Graham Bell who encouraged Langley's work in aërodromics at a time when even the radical minds in the scientific world looked askance at the man who would fly. And he was the sole witness, other than Langley's workmen, of that historic flight at Quantico, Va., in May, 1896, of which Dr. Bell has said:

"The sight of Langley's steam aërodrome circling in the sky convinced me that the age of the flying-machine was at hand."

CAPE BRETON'S CONTRIBUTION TOWARD THE MASTERY OF THE AIR

For the next ten years Graham Bell devoted himself to the perfection of his tetrahedral kites. On December 6, 1907, the giant Cygnet No. 1 made an ascent of 168 feet above the waters of the Bras

d'Or Lake, carrying Lieut. Thomas E. Selfridge, of the U. S. Army.

This was the first machine of the Aërial Experiment Association formed by Dr. Bell in 1907 with summer headquarters in Cape Breton, the object being "to get into the air." Associated with him were Lieut. Thomas E. Selfridge, who was detailed by the U. S. Army to assist the experiments; two young Canadian engineers, F. W. Baldwin and J. A. D. McCurdy, and Glenn H. Curtiss, who was the motor expert of the association.

They got into the air. It was with an A. E. A. machine, the "Red Wing," that F. W. Baldwin made the first public flight in America over the ice at Lake Keuka, N. Y., in 1908—a flight of 318 feet, 11 inches; twenty feet in the air! Then the "White Wing" flew a thousand feet or so, and in the third machine, "The June Bug," Glenn Curtiss won the *Scientific American* trophy for flying the first measured kilometer under test conditions. And finally came the "Silver Dart," which Cape Breton claims as particularly hers, because in it, on February 23, 1909, J. A. D. McCurdy, a Cape Bretoner born, over the ice of Baddeck Bay, made the first flight in the British Empire.

Its aim accomplished, the Aërial Experiment Association automatically dissolved in March, 1909. This work of eighteen months, financed entirely by Mrs. Bell, resulted in the development of features which are fundamental in all modern heavier-than-air flying-machines; and it was the apprenticeship of men who were to go far in the art.

Selfridge unfortunately met his death in an accident to one of the Wright machines, at Fort Myer, in 1908—the first victim of modern aviation. Baldwin and McCurdy continued to fly, and with their Baddeck-built machines were the pioneers of Canadian flight.

A BADDECK-MADE BOAT WHICH HAS A SPEED OF 70 MILES AN HOUR

For the last ten years Graham Bell and F. W. Baldwin have been associated in the development of high-speed boats of the submerged hydroplane type—hydrodromes they call them, and abbreviate the term to "HD." The "HD-4," which makes 70 miles an hour is the latest contribution to the series. It embodies the best features developed in their ten years of joint experiment, and it is the fastest boat in the world (see pages 47-49).

During the war the Beinn Bhreagh laboratories, where the HD's have been built, were converted into a boat-building establishment, and did useful work in building small craft for the Canadian and British governments. It was the first boat-building plant in Canada to employ women workers.

THE FIRST STATION FOR TRANSATLANTIC WIRELESS

As Cape Breton received the first direct cable message from Europe to America, so thirty-five years later the first public wireless message between the hemispheres was sent from the Table Head station near Glace Bay. The message was from the Governor-General of Canada to Edward VII.

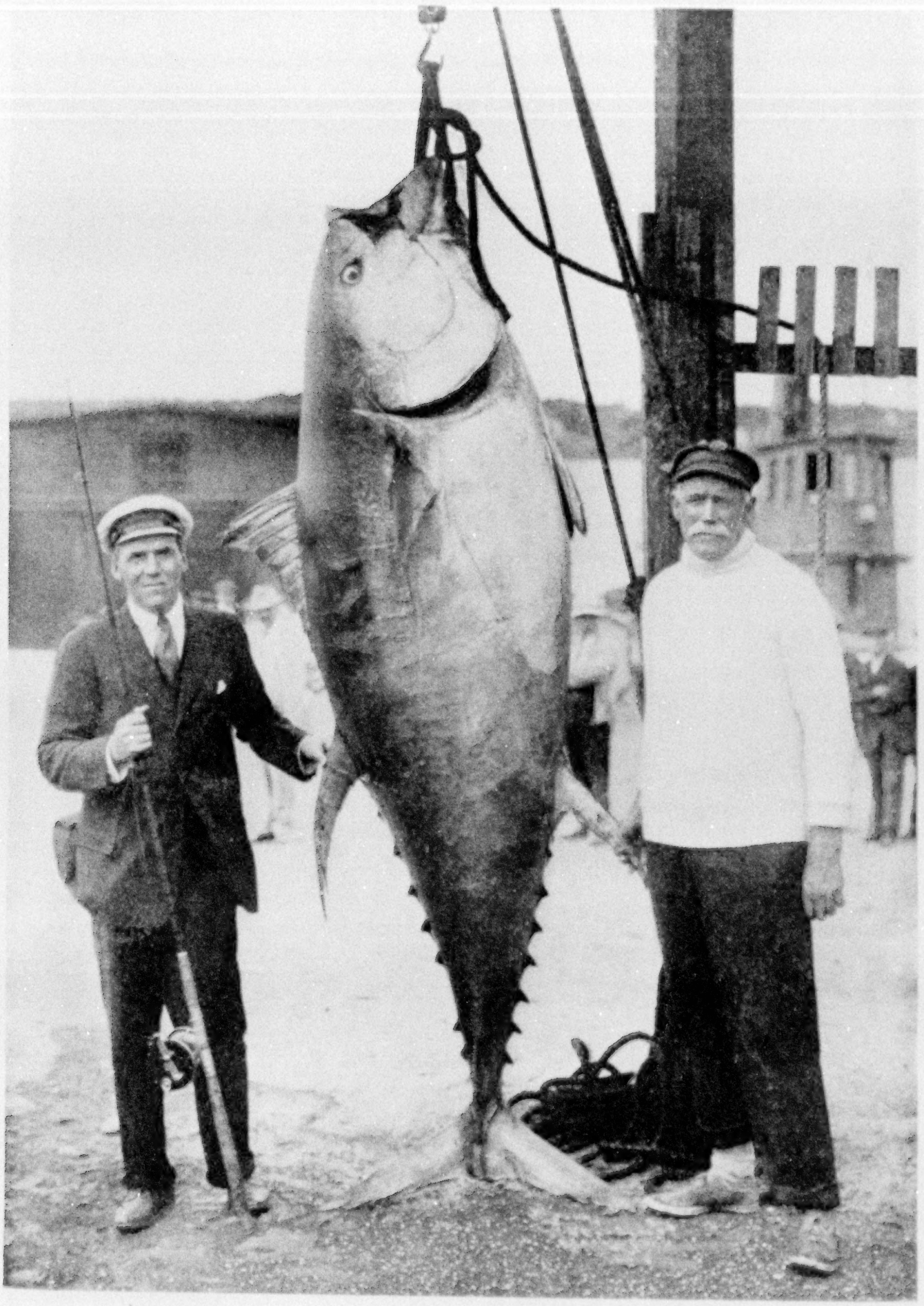
In permitting this purely British interchange for the historic message, Signor Marconi evidenced his appreciation of Canada's assistance in his experimental work, after the opposition of the cable people compelled him to abandon his work in Newfoundland.

The site for this first station in the Americas was given by the Dominion Coal Co., and the expense of erecting the first four towers was largely covered by an appropriation of the Canadian Government.

THE FINEST SCENERY IN THE MARITIME PROVINCES

The finest scenery in the Maritime provinces is to be found in northern Cape Breton and through the lovely Bras d'Or Lake region of the interior.

Most striking of the island's physical features is this inland sea, known in its two sections as the Great and Little Bras d'Or lakes. Widening out from its two Atlantic entrances, it extends in its 450 square miles of area through the heart of the island—nearly a thousand miles of interior coast-line bordering all four counties and forming in enchanting succession wide harbors, island-dotted bays, and deep fjord-like channels. A ship canal at historic St. Peters, across the old Indian portage of Nicholas Deny's



THE WORLD'S RECORD TUNA, WEIGHING 680 POUNDS, TAKEN WITH THE ROD AND LINE SHOWN IN THE PICTURE, AFTER MANY HOURS OF PLAY, BY J. K. L. ROSS AT ST. ANNS BAY, CAPE BRETON

This giant tuna, locally known as the horse mackerel, ranges in weight from 500 to 1,200 pounds. Its capture affords most exciting experiences to those fond of the sport. On one occasion Mr. Ross played one of these tuna 19 hours. After dragging him with his row-boat some 20 miles down the coast, the fish broke the line and escaped. Photograph from Mr. Ross.

THE BAY OF ST. ANNS, CAPE BRETON, THE PORT OF EMBARKATION FOR THAT STRANGE HEGIRA TO NEW ZEALAND (SEE PAGE 53)

time, connects the lake waters with the Strait of Canso.

"I have wanted to see the Bras d'Or Lakes," said a summer visitor recently, "since my first trip through the Canadian Rockies. We had with us a well-known guide, who listened patiently to our raptures until one of the young girls of the party turned to him and cried enthusiastically, 'How inspiring it must be to live always in the midst of this magnificent scenery!' 'Scenery!' he said, almost contemptuously. 'If you want to see scenery, Miss, go down to the Bras d'Or* Lakes, in Cape Breton, where I was born; that's where you'll see *scenery!*'"

This inland waterway was of great strategic value to the French, as at a later period it was a valuable means of transportation—indeed, the only means of transportation at first—to the Highland Scottish settlers. Today it affords easy access to the markets of the Sydneys for the farmers of the interior, no less than a natural playground for the people of the industrial centers.

* Though the name "Bras d'Or" (literally arm of gold) is usually considered a descriptive term original with the French, it is plain from the first charts of the island that the present spelling is simply the French rendering of the earlier name, "Labrador." It is an interesting conjecture whether that romantic Portuguese navigator who named "Terra Labrador" to the north may have first found his way into this magnificent waterway and given it the name it still bears.

ONE OF THE WORLD'S FINEST YACHTING COURSES

Here is one of the finest yachting courses in the world, with deep-sea cruising within easy reach of sheltered harbors, deep-water fishing, and sea-bathing. With only a few inches of tide, there are no untidy beaches or mud flats and no "head current when homeward bound."

It was Charles Dudley Warner who said: "The Bras d'Or is the most beautiful salt-water lake I have ever seen, and more beautiful than we had imagined a body of salt water could be. Certainly, as we glided out upon the summer waters and began to get the graceful outlines of the widening shores, it seemed as if we had taken passage to the Fortunate Isles. The most electric American, heir of all

the nervous diseases of all the ages, could not but find peace in this scene of tranquil beauty, and sail on into a great and deepening contentment."

The Bras d'Or lakes are all this and more. Words seem poor things, applied to the sparkle of blue waters under midsummer sun, the flash of seagulls' wings in purple shallows, or to headlands sometimes blue in the distance, sometimes brilliant with October coloring and hazy under the heat of Indian summer, or snow-capped and vivid against dazzling winter skies.

A CHARM PECULIARLY ITS OWN

Those who are fond of seeing in everything a likeness to something else compare Cape Breton scenery variously to the Highlands of Scotland or to Killarney; but the world-traveled Americans who have made it their summer home since its rediscovery by Warner find that, as lovely as all these, it has a charm peculiarly its own.

Besides these great stretches of inland sea, there are several beautiful fresh-water lakes—the largest, Lake Ainslie, with a length of twelve miles; Loch Lomond, as picturesque as its name, and the Lakes-o-Law, headwaters of the Margaree River, of salmon-fishing fame. For loveliness these lake districts rival the Bras d'Or. There are graceful wooded hills, rich upland pastures, and stretches of fertile intervale between.

Lake Ainslie is in the heart of a rich farming country that extends from the Baddeck and Middle rivers through the beautiful valley of the Margaree, and reminds one of how much underrated are the agricultural possibilities of Cape Breton.

THE ISLAND'S DIVERSIFIED PHYSICAL FEATURES

No country in the world is better adapted for mixed farming or has greater rapidity of growth, once vegetation is started. Oddly enough, the lateness of the spring gives Cape Breton fruit-growers an advantage over those of the famous Annapolis Valley of the neighboring peninsula, as the blossom buds do not develop too early and the proximity to the lakes is a safeguard from early autumn frosts.

If one had to use just a single word to describe Cape Breton, it would have to be "diversified." There is a diversity of people, of products, of industries, but especially of physical features. Beyond the fertile Margaree Valley, stretching away 1,100 square miles to the north, is a great elevated table-land, in some places 1,200 feet above sea-level and only broken by the ranges of mountains lining the coasts.

This plateau is covered with stunted spruce, moss, and rock, and is a natural game reserve that until recent years afforded the finest of moose and deer and caribou hunting.

There are still caribou and deer and brown bears, and good partridge shooting in the hills, but the moose have been exterminated and the "barrens" are most frequented for the quantities of luscious blueberries in season. The berries are of great size and fine flavor and have been canned successfully for the market.

There are tracts of peat-bogs here that may account for the complaint of the traveler that "the higher you go in Cape Breton the wetter it gets."

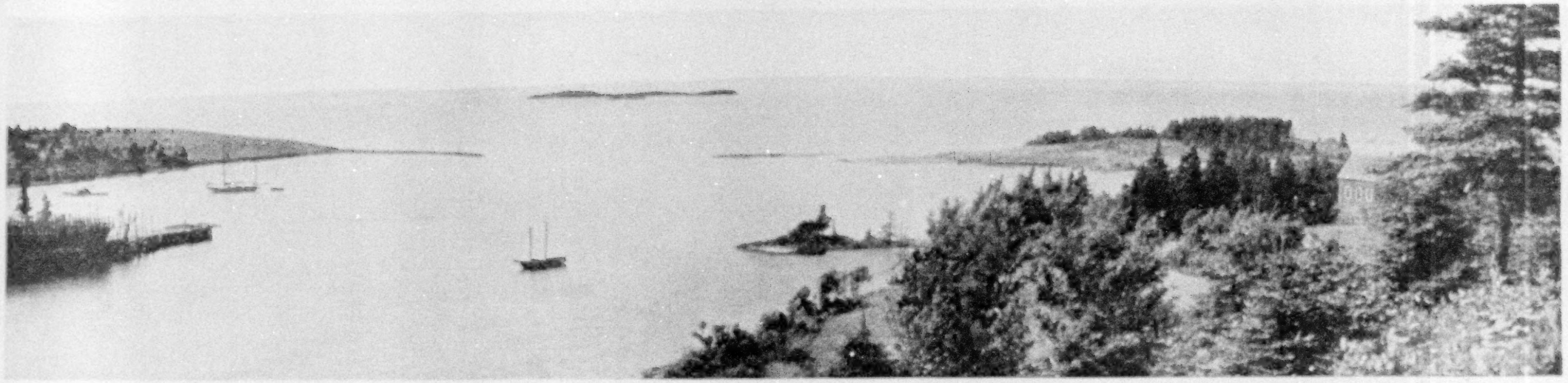
The north of the island can be reached by steamer from the Sydneys or overland.

A STRANGE HEGIRA TO NEW ZEALAND

Overland from Baddeck, which unquestionably has the most beautiful surroundings of any spot on the island, the historic St. Anns Bay district is the first stage of the journey. Here the fathers of the Society of Jesus labored among the "sauvages" in the days before Louisburg, and here are the remains of the later French fortifications, built when Louis XIV and his ministers debated whether this or Louisburg harbor should be their naval base in the Americas.

The little cove can be seen where the bark *Margaret* was launched, the first of the six vessels built for that strange hegira to New Zealand of the Rev. Norman Macleod and more than eight hundred of his flock.

St. Anns folk still tell of the power of this "prophet, priest, and king," who disclaimed any earthly authority higher than his own, dealt with the Old Adam



PANORAMIC VIEW OF ELSIE'S HARBOR: BRAS D'OR LAKES, CAPE BRETON

The shores of the Bras d'Or Lakes are studded with scores of these delightful havens, where the yachtsman finds comfortable quarters for his craft. Note on extreme left the three-master wooden schooner in course of construction.

BEHIND THE BAR, IN BOULECEET HARBOR: CAPE BRETON

The Bras d'Or Lakes offer the safest course for small yachts known. In these lakes the sportsman has no fog, no tides, no hidden rocks to contend with, and the water is as salty and clean as the ocean (see page 52)

of a primitive community solely by the virtue of an extraordinary personality, and when more than seventy years of age was the moving spirit in almost wholesale emigration of the Highland settlers to the other side of the world.

He discountenanced the small vanities of the womenfolk and once forbade the wearing of muslin ruffings, then the vogue for Sunday headgear. An official of the kirk was sent from door to door to collect the irons used for fluting the accessory, and these vexations of the pioneer spirit were consigned to the depths of St. Anns Bay.

THE HOME OF A FAMOUS GIANT

Englishtown was the home of Angus McAskill, the Cape Breton giant who toured the globe under the same management as Tom Thumb.

That McAskill was seven feet nine inches in height, with the girth of two men, and lifted hundred-pound weights with two fingers, still interests the tourist, who can see the giant's grave and the clothes that he wore, and may, if he wishes, try on his boots. But by his Cape Breton neighbors Angus McAskill is also remembered as a personality, and anecdotes of his kindliness and personal charm are as current as are those of his herculean size and strength.

Beyond St. Anns and Englishtown, with their hills and cliffs and encircling blue waters, the drive along the North Shore is surpassingly lovely. Landward there are ever the hills, near and remote, the green meadows of farmlands "abounding in the richest of milk and Celtic respectability and gravity and hospitality"; seaward the Atlantic, and in the distance, sheer out of the ocean towers "Smoky."

Once seen, the view looking southward from Smoky is never forgotten. Headland after headland in outline reaching out to the eastward, plaster cliffs dazzling white against the distant blue, and, 1,200 feet below, the long roll of the Atlantic.

Across Smoky is the village of South Ingonish, with magnificent sand beach and surf bathing, and beyond the road leads over hill and barren to Neils Harbor, and farther still to Dingwall and Cape North (see pages 57-58).

TWO MEN WEARING THE WAISTCOAT OF CAPE BRETON'S FAMOUS GIANT, McASKILL: HIS BOOT IS SHOWN AT THE RIGHT

These coast villages are cosy fishing communities, settled in great part by Newfoundland fishermen, with some families of Irish extraction and a sprinkling of Scots. Traces of the early Portuguese occupation have been found along these coasts.

Ingonish, originally Niganiche, was one of Louisburg's outlying posts. In 1729 it had a considerable population and an imposing church. About 70 years ago the bell, weighing more than 200 pounds, was found buried in the

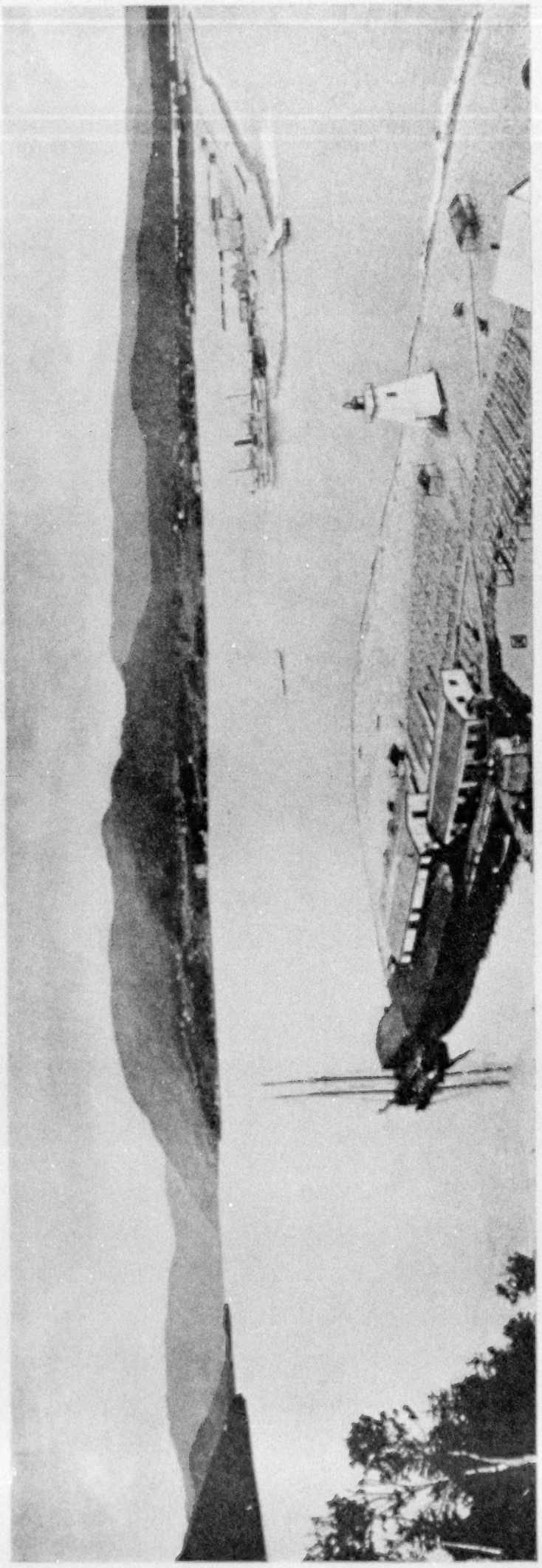
A TROUT POOL NEAR CHETICAMP: CAPE BRETON

CODFISH DRYING IN CAPE BRETON ISLAND

THE CALM BEAUTY OF ASPY BAY: CAPE BRETON

CAPE BRETON'S FARTHEST NORTH: CAPE NORTH

Around this bold Cape Breton headland, which is so lovely in fair weather, sweep tides and currents almost as changing as the winds, making this coast one of the most dangerous shore-lines in the North Atlantic. Yet each little cove contains its fishing settlements whence hardy men venture out every month of the year.



THE PICTURESQUE HARBOR OF SOUTH INGONISH: CAPE BRETON (SEE PAGE 55)

"Across Smoky is the village of South Ingonish, with magnificent sand beach and surf bathing, and beyond the road leads over hill and barren to Neils Harbor, and farther still to Dingwall and Cape North" (see page 57).

sand of the beach. It bore the inscription: "Pour la paroisse de Niganiche j'ai ete nominee par Jean Decarette et par Francois Urail, parrain et marraine, Le Fosse Huet de St. Malo m'a faite l'an 1729."

On the west coast, north from Cheticamp to Bay St. Lawrence, the scenery is fully as picturesque as that of the eastern side, but until very recently has been less accessible to the tourist.

There are ghost stories and tales of witchcraft and second-sight reminiscent of the Outer Hebrides for every rural locality. The Old Nick is a very real personage indeed and frequents lonely roads in various guises, according to the habits of the narrator and the hour of the morning.

A LAND OF NICKNAMES

Cape Breton is noted for its nicknames. Not only are they numerous, but in the Highland communities especially there is an aptness about them that makes them stick—sometimes for generations. More striking, however, than the existence of the purely personal sort of nickname that, after all, is universal, is the prevalence in present-day Cape Breton of the typical Highland by-names and patronymics that centuries ago gave rise to the Sept names of the great Scottish clans.

The custom of identifying families by their pedigrees is as old as Celtic tradition.

So, in Cape Breton today, where there are whole communities of Macneils, or Macraes, or Macleans (in one polling district of 227 names there are 103 Macneils and only eighteen

ALEXANDER GRAHAM BELL AND THREE OF HIS GRANDCHILDREN IN CAPE BRETON ISLAND

other names among the remaining 124 voters), there exist the same identifying names current in the Scottish Highlands from the time of Malcolm III.

Where there are a half dozen families of Mackinnons, for instance, sharing in the Christian names of Donald, Angus, and Sandy, etc., Sandy's children are likely to be identified as Donald Sandy or Angus Sandy, or Sandy Sandy; Angus's

children will be distinguished as Donald Angus and Sandy Angus, etc. The grandchildren become Angus Donald-Sandy or Sandy Donald-Sandy, and so on, to unbelievable lengths.

If, as often happens, there are more persons of one name than can be so distinguished, one family may be known as Sandy Ruadh (Red), or Sandy Ban (White), or Big Angus, or Little Angus, or Angus the Cobbler, and the adjective may persist to the third or fourth generation.

A generation ago these by-names following the surnames could be found on the electoral voting lists in Cape Breton and country merchants frequently resorted to them to identify the Duncans and Donalds, Normans and Neils on their ledgers. Even today the bracketed "John's son" or "Rory's widow," which avoids the confusing of the persons with others of the same name, are very common.

In the same way Angus Matheson, carpenter, is distinguished from another Angus Matheson, mason, or from a third who is a wheelwright; and occasionally a genuine family by-name appears like Ranald Macdonald (Bain) or Ranald Macdonald (King), the respective Ranalds being better known as Ranald Bain or Ranald King than by their mutual surname.

In the Cape Breton "nickname," pure and simple, there is the same personal touch that goes with a nickname anywhere—not often complimentary, but very much to the point. Besides "Johnny the Widow" or "Mary-Ann Captain Dan Sandy," which are strictly patronymics, there may be "Duncan the Bear," originating with some personal exploit of Duncan's, or "Willie Holy," whose father was Holy Willie, his piety leaving as much to be desired as the sobriety of Sober Neil, who took his whisky neat and often, like a good Cape Bretoner.

J. A. H. Cameron, in his "Colonel from Wyoming," illustrates this typically Cape Breton form of nickname with the story of Angus the Ox. The hero of the tale was Axe-handle Angus, "who used to do some coopering in the shape of making axe-handles for some of the Sydney merchants. He stole an ox once, long, long ago, and sold it to Archie the Brewer for ten gallons of home-made whisky; and when he came home, after spending three months in jail, instead of calling him Axe-handle Angus, they called him Angus the Ox; they called his brother Donald the Ox and his sister Nancy the Ox."

The family was ever after known as "The Oxen," and the poor people were so sensitive about it that they gave up raising oxen, even for their own farmwork.

CHANGING THE ISLAND'S CLIMATE A REMOTE PROSPECT

The summer weather has no extreme heat, while the island's insular position and proximity to the Gulf Stream give it a winter climate less severe than many more southerly parts of the mainland.

The island is in the latitude of southern France, and if the blocking of the Straits of Belle Isle is accomplished, diverting the cold Labrador currents that now retard the spring, Cape Breton may share with the New England coast in orange and olive growing, and perhaps sunny vineyards will replace the storm-tossed forests on Smoky's rugged face.

The prospect is sufficiently remote, however, to leave undisturbed for the present those of us who prefer Smoky as it is, and the autumn tints of maple and beech and birch, which give gorgeousness to Cape Breton Octobers, to the sunniest vineyards.

Whether it is due entirely to the rugged stock from which they come or (in part) to some virtue of the climate, these Cape Breton descendants of the Scots are remarkably long-lived. Indeed, it would seem that Ponce de Leon missed his objective only by taking too southerly a course, and that in this bracing island air, rather than in softer climes, is the magic elixir of eternal youth.

As "Sam Slick" has summarized it: "I don't know what more you'd ask. Indented everywhere with harbors, surrounded with fisheries, the key of the St. Lawrence, the Bay of Fundy, and the West Indies; prime land above, one vast mineral bed beneath, and a climate over all temperate, pleasant, and healthy; if that ain't enough for one place, it's a pity; that's all!"

ALONG OUR SIDE OF THE MEXICAN BORDER

By Frederick Simpich

Formerly American Consul at Nogales, Mexico, Author of "Where Adam and Eve Lived," "Mystic Nedjef, the Shia Mecca," "The Rise of the New Arab Nation," etc.

THE Mexican border! What a frequent phrase! How it hints at turmoil and intrigue, at wild night rides by cavalry patrols, at gun-runners and smugglers! How suggestive it is, too, of brown-faced, snappy-eyed girls in red skirts and *mantillas*, peddling *tamales* and *dulces;* of Mexican women washing clothes, babies, and dishes in irrigation ditches; of burros, hens, and pigs foraging about adobe doorways!

For years our papers have run news stories under border town date-lines, telling of turbulence and strife, of adventure, romance, and intrigue. Hardly a week passes but a front-page story "breaks" somewhere on the Mexican border. No region in all North America is more frequently mentioned or more widely misunderstood, perhaps, as regards places,* routes, distances, and the habits and customs of its people.

Now a boundary, they used to tell us at school, is an imaginary line between two countries. But in various jails hard by this long line of muddy water and stone obelisks that marks where the U. S. A. quits and Mexico begins, there are always a few tardy fugitives who deny that this line is "imaginary." It unites us with Mexico, or separates us from it, they say, depending on the humor of border sheriffs at particular moments.

At Nogales they tell of a fugitive from American justice, hard pressed by the Yankee police, who fled and fell sprawling fairly across this line—his head and shoulders in Mexico, the rest of his body in Arizona. Frantically his waiting Mexican friends grabbed him by hair and hands, seeking to drag him over to safety.

But a pursuing constable dropped heavily on the fugitive's feet, with a pistol against the American part of his anatomy, and bawled such ominous threats that the runaway squirmed hastily home again. More than one border bad man "bit the dust" because he didn't know just where this line was or didn't reach it in time.

In other ways the social cleavage of this border is sharp and startling. It cuts us off abruptly from another people, showing an odd, interesting "cross-section" of diverse civilizations, proving again what the Roman said about races of men differing in manners and habits, in standards and traditions.

Nor are all the people along this line either Yankees or Mexicans. Thousands of Chinese are settled here, on the Mexican side; and Turks and Japanese, and twenty Indian tribes speaking twenty of the babel of tongues heard in Mexico.

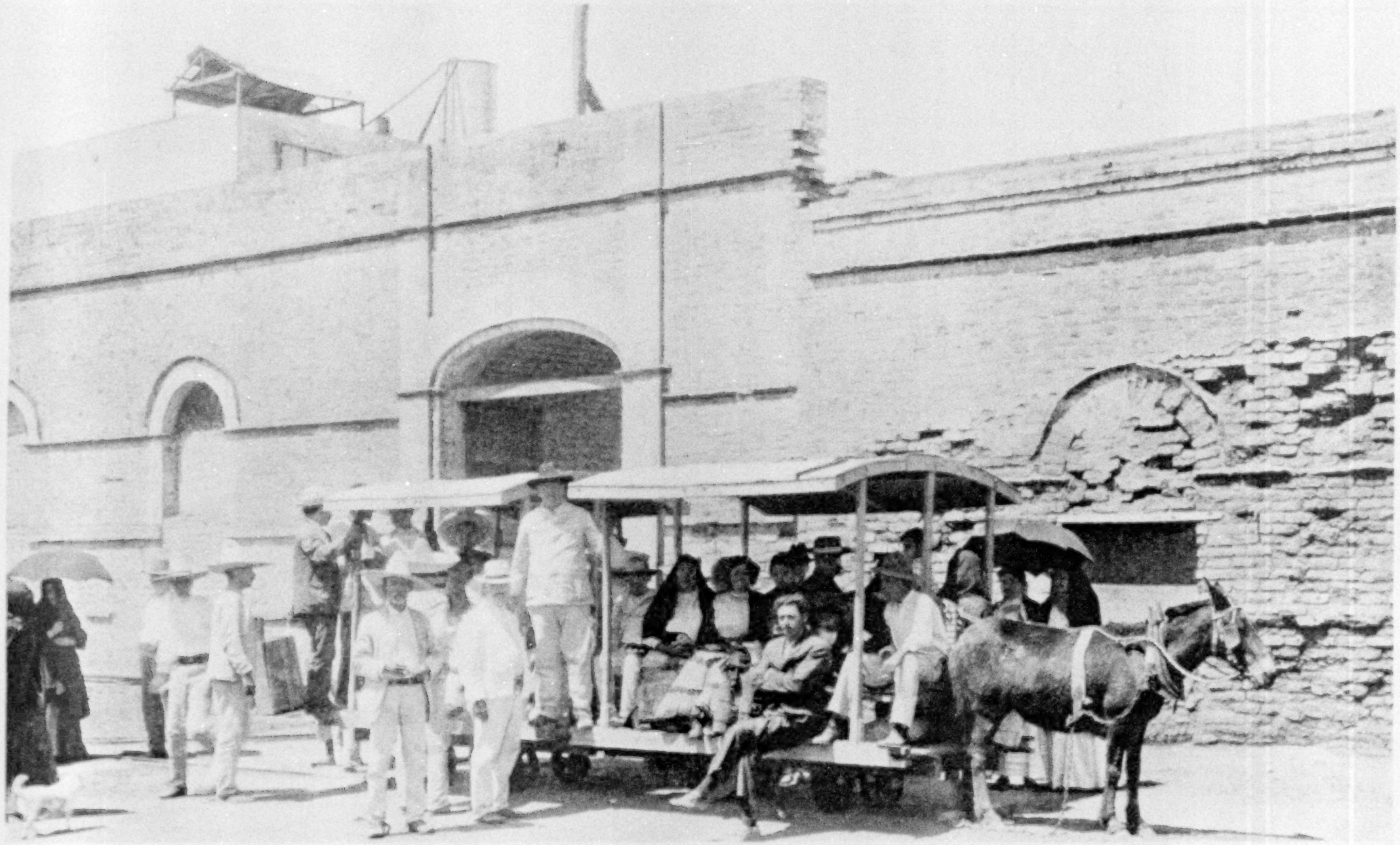
IT'S A LONG, CROOKED LINE

Thousands of settlers migrate to this border-land each year, losing themselves in the vast, hazy-blue stretches of its open country; but they are Americans all, mostly from the Middle West and the South. The hordes of Finns, Slavs, and Neapolitans that pour into our Atlantic ports never get this far; they stop in the manufacturing centers of the East. In Texas and California, of course, native-born generations are found; in the newer States of Arizona and New Mexico most of the residents (barring children) have come from other States.

Adventurous, colorful, and full of contrasts as it is, the 1,800-mile trip along this crooked, historic line is rough and difficult and has been made by few people.

Some of the wildest and least known regions of our country are piled up against this border. Ask any doughboy, of the many, many thousands who have

*A common cause of geographic confusion is the large number of towns in our Southwest which bear Spanish names, and the frequent recurrence of these identical town names in Mexico. Names like Santa Cruz, Del Rio, Casa Grande, etc., occur on both sides of the line. "Alamos" are found by the dozen; likewise "San Juans."



Photograph by Harry A. Lawton

A UNIT IN THE STREET RAILWAY TRANSPORTATION SERVICE OF A MEXICAN BORDER CITY

This type of street-car may seem obsolete to the individual accustomed to the modern electric line, but less than a quarter of a century ago the horse-car was in use in Washington, D. C., and it disappeared from the cross-streets of New York City less than a decade ago.

done a "hitch" on the Mexican border, what he thinks, for instance, of Ajo or the Yuma sector (see map, page 75).

From the Gulf up to El Paso, along the Texas frontier, the Rio Grande forms the boundary between the United States and Mexico; thence to the Pacific coast the line is marked by stone or iron monuments (save a short break at the Colorado), so set that one is supposed to be visible from another. By this plan a soldier, miner, or cowman (yes, and a smuggler, too) can always tell which side of the line he is on; or, if wholly lost and he comes suddenly on a monument, he can soon get oriented.

The Rio Grande part of this border has caused both Uncle Sam and Mexico much work and mental anguish. During bad floods the line as formed by the river squirms around in so astonishing and lively a manner that what is Mexican soil one day may be in Texas the next, and *vice versa*.

Then, too, there is the ever-recurring problem of dividing the waters of the river for irrigating purposes. Around such places as Laredo, Texas, this situation affords many an acrimonious international argument, especially during the low-water period in the summer.

Sometimes the Texans open their sluices and threaten the ruin of the little *fincas* on the opposite bank; then the brown brother recalls the time when the grand Mexican State of Coahuila extended westward to the Pacific Ocean and almost up to Kansas City, Missouri, and his remarks are quite untranslatable.

When there is a heavy snowfall in the mountains of New Mexico and Colorado, the spring freshets fill the Rio Grande with a flood that brooks no turning; weirs, gates, and bridges are swept away, the river banks and the adjacent farms are often submerged, and the nagging contestants for the river's midsummer favors are forced to flee to the highlands.

RAILROADS THAT CUT THE BORDER

Railroads cut this long border line at Brownsville, Laredo, Eagle Pass, and El Paso, Texas; at Douglas, Naco, and Nogales, in Arizona, and at Calexico and Tia Juana, in California. Only four of these railroads, however, are main lines of through traffic that penetrate the interior of Mexico; these start at Laredo, Eagle Pass, El Paso, and Nogales.

Mexico itself, area considered, has comparatively few miles of railroad, and there is no line traversing its northern frontier east and west, like our Southern Pacific, which practically parallels most of our southern border.

Mexicans are restless. The peons like to ride. Whenever they have saved money from a few days' work, they swarm up and down these lines to border towns, carrying women, children, birdcages, blanket rolls, and family utensils, running to and fro apparently as aimlessly as the inhabitants of a disturbed ant-hill.

ALONG THE TEXAN FRONTIER

You visualize the bigness of Texas when you look at the length of its side that borders on Mexico. It has been said that "if you should tip the State up and drop it north, like a flapjack, it would fall on St. Paul; tip it east and it would splash in the Atlantic; south, it would blot out most of Mexico." Its area is more than double that of the British Isles.

You realize its emptiness, too, when you travel through some of its border regions, where the population is less than two per square mile. If all the people in the United States were put in Texas, it would still be scarcely more than two thirds as crowded as England.

No section of the border has seen so much of adventure, tragedy, and turbulent activity as Texas. The flags of France, Spain, and Mexico have waved over it; for a time it flew its own Lone Star and also the Confederate flag.

"If I owned Hades and Texas, I'd rent Texas and live in the other place," Phil Sheridan said when, as a young lieutenant, he stood "The Watch on the Rio Grande," way back in the 50's. But since then Texas, like Arizona, has cast out its devils. It was absolutely "bone dry" long before July 1, 1919; today only the police can "tote" guns; poker is taboo, and even bridge for a cent a point may land you in the "hoose gow"—Texas for *juzgado* (jail).

In Brownsville you hear more Spanish than English, because most of the 8,000 people who live there are Mexicans. Till

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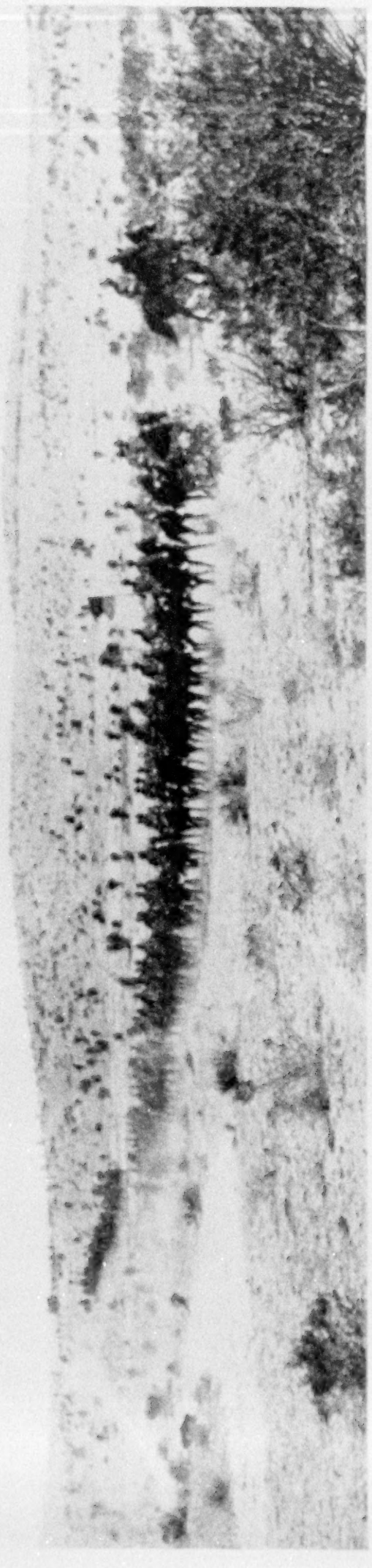

Photograph by International Film Service

AN AMERICAN ARMY ESCORT ACTING AS A CONVOY FOR SUPPLIES ALONG THE MEXICAN BORDER

The scene is that of a typical alkali plain, where only snakes and cacti thrive, and where the dust is so penetrating that it will find its way into the watch in one's pocket. Before railways were built in the southern republic, a Mexican president characterized this desert as his country's strongest defense against invasion.

the railroad came, a few years ago, this remote, isolated region was practically unknown to Americans at large. It is still a wild, thinly populated, stock-growing district. The natives plow and haul largely with ox-teams. As one writer said, "Even if Texas has been occupied by white men for four centuries, it is still somewhat new in spots—and big spots at that."

Zachary Taylor built a fort in 1846 hard by this same Brownsville. When his men got into a shooting scrape with Mexican soldiers from Matamoras they started the Mexican War, and the Rio Grande became the boundary between the two republics.

Up the river from Brownsville lies Laredo, most important border town in south Texas, even if an old map does call this vicinity "a wilderness filled with wild horses." Here you may still see the ruins of old stone houses and tanks built by Spanish planters generations ago.

Laredo staged many dramatic events in the stirring annals of Texas. Today, however, the people have turned from romance to onions. They shipped 2,500 carloads in one season.

Till the International and Great Northern Railway extended its line from San Antonio, Laredo also was shut off from the rest of Texas; now it is the main port of entry for traffic with Mexico City, over the Mexican National Railway.

Eagle Pass, on up the Rio Grande, was a favorite camping spot for the California gold-hunters in '49. Yankee freighters from St. Louis, too, used to drive through here for Chihuahua and Durango.

Worn, weather-beaten carretas, clumsy carts with solid wood wheels sawn from huge logs and built wholly without nails or spikes, are occasionally seen even now, abandoned in some brush-

grown corral, reminding you of the slow, tedious transportation of early days, when it took a year to get freight from New York to Durango.

Now a branch of the Southern Pacific strikes the border at Eagle Pass, and from the Mexican town of Piedras Negras (Black Rocks), just opposite, a line of the Mexican National runs south into one of Mexico's most fertile regions. This gives Eagle Pass a brisk trade.

No spot on the whole border affords more of impressive grandeur than the region about the mouth of the Pecos. This yellow, turbulent stream roars into the Rio Grande near the town of Del Rio, foaming along the bottom of a steep-walled canyon worn hundreds of feet deep in the solid rock. The Southern Pacific Railway crosses this canyon, near the border, on one of the greatest steel trestles ever built.

At the old Fort at Camp Verde, north of Uvalde, is a relic of one of the oddest experiments ever made by our government. It is an Arab *khan*, in ruins now, but in its time an exact replica of the rectangular adobe caravansaries built along such caravan trails as that from Bagdad to Teheran. Back in 1856, when Jefferson Davis was Secretary of War and the famous experiment was made with camels for army transport use between Texas and California, this *khan* was built.*

As you follow the border west, oaks, pines, and underbrush decrease, aridity increases, and cacti lift their thorny heads. Cattle, goats, and sheep are pastured in large numbers; but, except for irrigated areas along the river, the country is thinly settled and undeveloped. Border counties like Brewster, Presidio, and El Paso are of amazing area—larger than some of our small eastern States. Windmills are everywhere—"big electric fans to keep the cattle cool," a waggish cowboy once explained to a London tenderfoot.

El Paso ("The Pass"), great border mart of west Texas, is set on the edge of a rich stretch of the Rio Grande Valley. It stands at the point of intersection of two old highways, the first channels of traffic established by white men in America.

A popular automobile trail to the Pacific coast now runs this way. Coronado, pathfinder for border tourists, blazed the way in 1540, on his march to Santa Fe, and long ago El Paso was the headquarters for the Spanish Government in this part of America.

THE ONLY LARGE CITY BETWEEN SAN ANTONIO AND LOS ANGELES

El Paso is the only large city from "San Antone" to Los Angeles, a ride of 1,500 dry, dusty miles. It is well served by both American and Mexican railways, and its merchants buy and sell goods for hundreds of miles below the Rio Grande. Despite the arid country about it and its occasional blinding dust-storms, its climate is exceptionally good, owing to high elevation.

Summer showers afford a rainfall of about 10 inches. Soil is fertile in the valleys cutting the adjacent plateau country, and good crops are grown wherever ample irrigation is possible.

The largest irrigation reservoir anywhere is the great Elephant Butte dam, which stores more water than the world-famous Assuan dam on the Nile. This big dam, built in the Rio Grande above El Paso, at a point in New Mexico, holds water enough, we are told, "to fill a standpipe 11 feet in diameter reaching from El Paso to the moon, or to cover Massachusetts to a depth of six inches!" Enough water can be stored to last through four dry seasons and to irrigate

*Camel transportation along the Mexican border was undertaken by the government with two herds, totaling about 75 animals, including a few two-humped Bactrian males, imported for breeding purposes. Six Arabs and a Bedouin camel doctor came along, from Smyrna to Texas. Lieutenant Edward F. Beale, under orders to establish a military road from San Antonio to California, used these camels in transport work. The camels were given a thorough test, and in Beale's report he spoke in highest terms of their work; but army horses and pack-mules were stampeded; obstinate mule-skinners refused to handle "circus animals"; so finally the camels were disposed of. Most of them were sold to zoölogical parks, but a few either got away or were turned loose on the desert. Prospectors, enraged when these ungainly brutes terrified their pack-mules, used to shoot them on sight. Even now, once in a while a desert rat drifts into Yuma or Gila Bend and vows he's seen a wild camel on the desert. Maybe he did, but nobody believes him.

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Photograph by Harry A. Lawton

PRIMITIVE WATER-CARTS IN USE ALONG THE MEXICAN BORDER

In some portions of Mexico the maximum rainfall approaches world records, but in the north, along the border, water rights are at a premium. Feuds, accompanied by the use of dynamite in diverting irrigation channels, have occurred in the cotton-growing lands of Lower California and Sonora. In many cases the supply of water permitted to flow through the irrigation ditches is calculated down to the very minutes per month.

300 square miles; but by an international agreement a part of the water goes to irrigate land in Mexico.

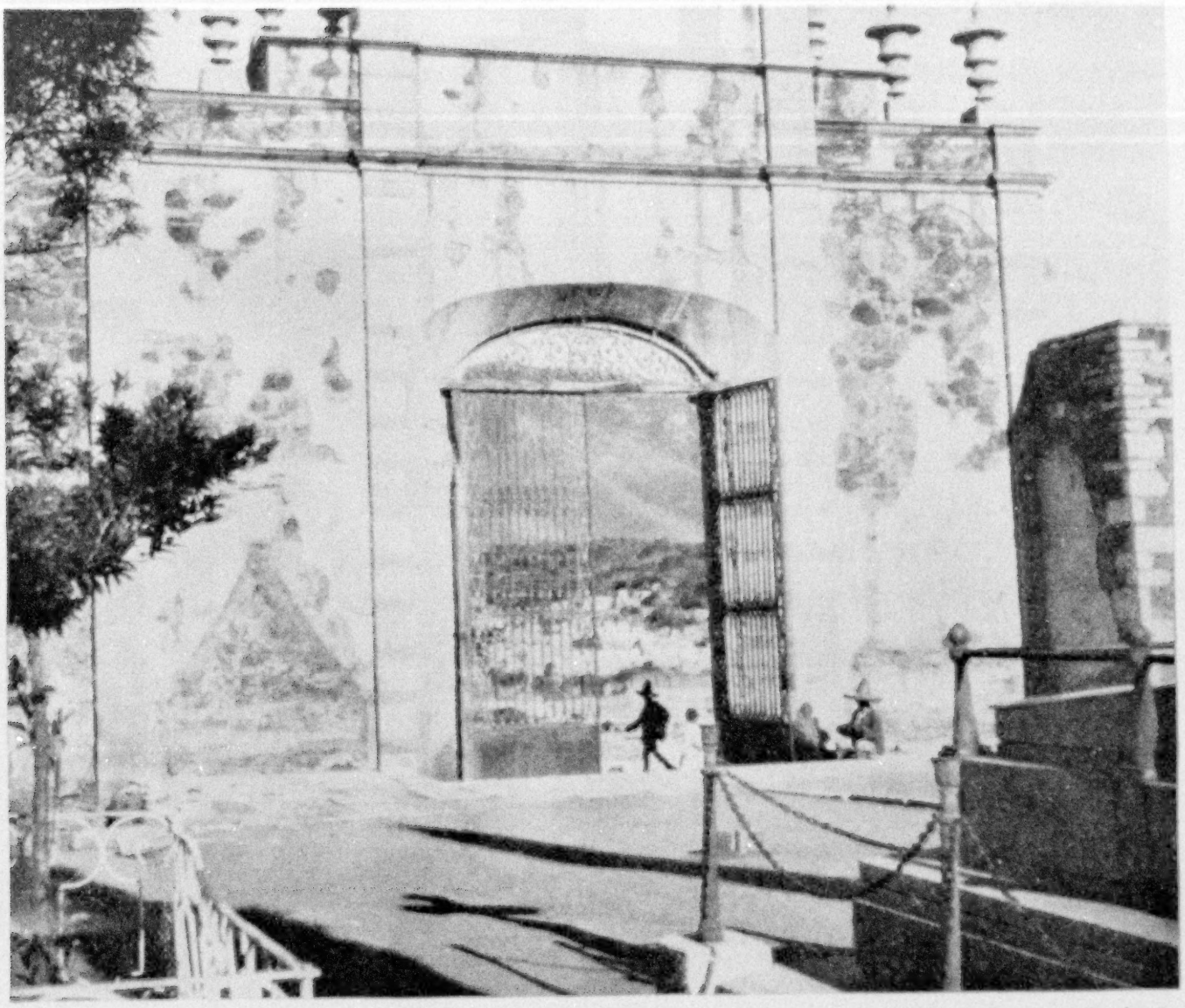
Fort Bliss, one of our largest permanent military barracks, is built just outside El Paso.

JUAREZ, A CITY KNOWN CHIEFLY FOR ITS BATTLES AND GAY AMERICAN TOURISTS

Juarez, El Paso's sister city across the Rio Grande, like most Mexican border towns, is known chiefly because of its pitched battles and its bizarre methods of entertaining sporty American visitors. Whatever it enjoys of life and prosperity it draws from Yankee tourist patronage.

A wooden bridge spans the river here, and El Paso street-cars loop over into Mexico—when the looping is safe.

Thousands of tourists swarm across this bridge each year to play the races, have a fling at keno or chuck-a-luck, or



Photograph from Frank H. Probert

AN ORNATE WROUGHT-IRON GATEWAY TO ONE OF MEXICO'S CITIES OF THE DEAD

Many of the cemeteries of the southern republic suggest the catacombs of Rome and the Campo Santo of Genoa. Tombs are rented by the month or year, and when the relatives of the departed fail to pay the fee required, the sheeted dead are unceremoniously dispossessed, their bones being thrown upon a pile where hundreds of others have suffered a like fate.

to mail bullfight or *ballerina* picture postals to the home folks to show that the writer has been "gay, blithe, and devilish in foreign parts."

It is a typical Mexican frontier town of squat, one-story adobe houses (plastered and painted light blue or pink), of *tiendas*, plazas, casinos, bull rings, Chinese restaurants, curio stores, and often a few lurking American derelicts waiting here till the sheriffs in their home towns are dead.

Like the natives of Nogales, Agua Prieta, and Naco, most of the peons of Juarez make a living by working in the adjacent American border town—swarming to the American side, carrying babies and bundles, when the rebel alarm is raised. From Juarez, Mexican railways lead off south, connecting with most important interior cities.

ONLY EIGHT INCHES OF RAINFALL ALONG THE LINE

From the point at Monument No. 1 where the boundary line crawls out of the Rio Grande (at the southeast corner of New Mexico), it strikes west into a wilderness of singularly dry and empty aspect. For 40 miles along this march the traveler must carry his own water.

Near Columbus a few small trees appear, and here, too, a wagon trail from Deming down to the American Mormon colonies in Chihuahua crosses the border.

To the west lie the rough, hostile foothills of the Dog Mountains; near here, in the San Luis Range, the line reaches

Photograph by Harry A. Lawton

A SHADY LANE ON A HACIENDA IN SONORA

Small farms are almost unknown in Mexico. The haciendas are vast landed estates embodying many features of the medieval feudal system. Until a few years ago, the haciendas were in the hands of 6,000 persons among a population of nearly 15,000,000. Some of these estates extended over scores of square miles and had as many as fifty miles of irrigation ditches within their bounds.

a point 6,600 feet above the sea, marking the continental divide. When that redoubtable outlaw, "The Apache Kid," led his renegade Chiricahuas, they made this locality their rendezvous; and through this same San Luis Pass runs the old emigrant trail.

Slightly west of the 108th meridian, the line turns at right angles and runs south for a few miles, thence west again.

In the San Bernardino Valley the line strikes the first running water after quitting the Rio Grande—192 miles to the east. Here rises the famous Yaqui River, that long, crooked stream that meanders through the vast Mexican State of Sonora and through the turbulent Yaqui Indian zone, finally emptying into the Gulf of California below Guaymas. Thousands of cattle find pasture around the marshy flats of this San Bernardino Valley, and here an old Spanish trading post lies in ruins.

In the whole 700-mile stretch from the Rio Grande to the Pacific, this line crosses only five permanent running streams, and the average rainfall throughout its length is only eight inches.

This border was first fixed by the Treaty of Guadalupe Hidalgo, and subsequently modified by the Gadsden Treaty, or "The Treaty of Mesilla."

In 1891-1896 a new joint commission erected the present monuments, the original heaps of stone having in many places been tampered with or carried away by prospectors for use as mine-boundary markers. These modern tombstone-like obelisks are made of rock where rock is available; in other places cast-iron monuments are set up on cement pedestals. They are never more than five miles apart.

Save the hamlets of Columbus and Hachita, the New Mexican section of this border is almost uninhabited.

WHEN APACHE HUNTING WAS THE GREAT SPORT

Hurdling this line in pursuit of Geronimo and his Apaches was for years a favorite outdoor army sport in these parts; but nowadays most ambitious residents are mining copper, roping and branding cattle, or fussing with irrigation ditches.

Around the camps and corrals, however, many grizzled freighters and post traders of earlier days are still loitering; and, true to form, they would rather talk of outlaws, stage-robbers, and historic killings than listen to a farm adviser tell how to outwit weevils or vaccinate a heifer.

One of these old-timers told me how he once slew eight *broncho* Apaches, and then hung them up by their feet to a stout mesquite tree near Lochiel; and that same night a hastening party of Las Cruces peddlers, bound for Hermosillo with a wagon-load of calico, came up and unwittingly camped almost beneath the live oak where the dead Apaches were hanging. Suddenly discovering the terrifying display, the peddlers hastily hitched up and did not make camp till they reached Magdalena, miles to the south.

Today the tamed Apache up around Globe is about the most trustworthy, diligent, and industrious farm laborer to be found in the State; and the two-gun man has gone to the movie studios of California, where the risk is nil and the stakes more certain. Freight wagons along the border are replaced by big auto-trucks, and the old trails are turned into motor highways covered with "camping-out" trippers whose cars bear pennant labels of towns from Peoria to Pasadena.

PUBLIC BATHS WHERE COYOTES RECENTLY ROAMED

Not long ago coyotes were chasing horned toads over an empty desert where Douglas now stands, with libraries, country clubs, theaters, a great Y. M. C. A., public baths, street-cars, and a hotel that might have been lifted bodily out of Cleveland or Kansas City.

The giant smelters at Douglas have run day and night since they were built, a dozen years ago, and have handled thousands of trainloads of ores from Bisbee and Nacozari (in Sonora). At night white-hot streams of molten slag, pouring on the dumps, throw great light flashes against the sky, remindful of Pittsburgh. During a six months' busy period in 1916 the "Copper Queen" and "Calumet and Arizona" smelters handled 131,000,000 pounds of copper, which at, say, 25 cents a pound, would give a value of $32,000,000.

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MEXICAN FUEL VENDERS AND PULQUE GATHERERS IN A CACTUS LANE

Thorny cacti such as these provide an almost impenetrable wall, from which even the hardiest trespasser shrinks.

Just over the line from Douglas lies Agua Prieta, from which point an American-owned railway runs south to the mining town of Nacozari, where the model mining camp of all Mexico is operated by the Moctezuma Copper Company, an American corporation.

Drab, dusty Agua Prieta, with its sleepy peons and sad-eyed burros, has a singular faculty of suddenly coming to life and getting front-page publicity from Boston to San Francisco. In its tumultuous recent years it has experienced everything from kidnapping, lynching, and robberies to artillery duels with Villa. Lately a person who coveted his neighbor's ass was found swaying on a rope, with this placard tied to his dangling feet: "He stole mules."

Douglas is about 4,000 feet above sea-level, with 14 inches of rain annually. Ten years ago the land hereabouts was empty. Today artesian wells are flowing—some as much as 600 gallons a minute—caterpillar tractors crawl across the vast Cochise, Sulphur Springs, and Paradise valleys, and the remaining unappropriated land is fast being filed on. There are three methods by which land is secured: direct purchase from the government, homesteading, and under the Desert Land Act.

West of Douglas, eight miles north of Naco, on the line, and quite hidden in the barren Mule Mountains, lies the quaint, up-side-down, busy, hustling Bisbee. Its main street runs up a deep canyon, many of its houses clinging like pigeon cotes to steep hillsides.

In times of freshet, mad torrents tear through it; once water was several feet deep through the lower floors of stores and houses. "Tombstone Street" and "Brewery Gulch" are suggestive of earlier and woollier days.

The popular Borderland Highway, connecting El Paso, Douglas, and Tucson with California, passes this way. Part of this route hereabouts was built with prison labor, under the "honor system" of Governor Hunt.

From Naco, notorious border village astride the line, the El Paso and Southwestern Railway strikes off northwest for Tucson. To the southwest runs a branch of the Southern Pacific of Mexico, serving the great Cananea Consolidated mines (American owned) and connecting at Del Rio, Sonora, with the Nogales branch of the same railway.

West from Naco, conspicuous in the vast grassy stretches of the San Pedro Valley, the straight row of stone monuments marches on, to climb into the wooded Huachuca Range; and a few miles to the northwest lies the shell of ancient, iniquitous, profligate Tombstone.

WHEN TOMBSTONE ACHIEVED FAME

The baffling psychology of names is nowhere more strikingly shown than here. From the day in 1878 when Ed Schiefflin, dodging Apaches, slipped into this canyon with his burros and struck the ledge that made him millions, Tombstone achieved fame. Motor parties on the Overland trail now pass this old prospector's tomb—an odd pyramid of boulders near the spot that made him rich.

Here were such mines as the "Ground Hog" and the "Lucky Cuss." Ore from the latter ran $9,000 a ton. The very name of the town drew the world's attention to it. Here one pioneer jester occasionally issued the famous *Arizona Kicker*, whose heroes used guns that shot around corners and up stove-pipes. Another sheet is (or was) named the *Epitaph;* and hereabouts, later on, the lively imagination of Alfred Henry Lewis gave us the "Wolfville" stories.

Climbing the Santa Cruz River west of old Camp Duquesne, the line runs over high, rolling grassy hills scantily covered with stunted live-oaks, and fairly splits in half the important border city of Nogales, entrepôt for all the trade of the Southern Pacific of Mexico. From this point branch lines also strike off north to Tucson and northeast to Benson.

Through this gap in the hills that Nogales now fills runs the ancient trail, worn ages ago by Toltecs and Aztecs and followed later by Spaniards and Jesuits in their advance from Guadalajara to California. Famous Father Keno (or Kuhn, to give him his real name) passed this way, and a few miles north of Nogales, in the Santa Cruz Valley, the ruined mission of Tumacacori (now a national monument) still rears its battered head.

Hard by lies the ancient Presidio of Tubac, where for years a Spanish garri-

XUM

Photograph from E. W. Nelson

THE HUGE CANDELABRA CACTUS OF MEXICO OFTEN REACHES A HEIGHT OF SIXTY FEET

The average rainfall along the Mexican border from the Rio Grande to the Pacific is probably less than in any other section of the United States—about eight inches annually, and on the Yuma and Colorado deserts it drops to two or three inches. This boundary line, more than 700 miles in length, crosses only five permanent running streams. It is remarkable that, although arbitrarily chosen, the line from the Rio Grande to the Colorado River follows almost exactly the summit of the divide which separates the waters flowing north into the United States and those flowing south into Mexico.

son was kept and whence Don Juan Bautista de Anza set out in 1774 to build a highway to California. It was this same Don Juan who chose the site for San Francisco on the Golden Gate.

Today near Tubac an American rubber company has bought thousands of acres of Santa Cruz Valley land and is farming guayule on a big scale for the manufacture of rubber. Nurseries for propagation of young plants are set up and a model town of cement houses and shady streets for the employees is already built.

Nogales, 3,800 feet above the sea, enjoys a singularly prosperous trade for a town of its size. The declared exports from Mexico run as much as twenty millions a year. As at other important border towns, adequate military forces are stationed here, with permanent barracks, hospitals, recreation halls, and stables. Some 12,000 people live on the American side of the line, and a somewhat lesser number in the Mexican town.

For police purposes, a high barbed wire fence is strung along the boundary line here, dividing the twin cities.

Nogales has foundries, bonded warehouses, strong banks, daily papers, and clubs, and is surrounded by rich mines and profitable cattle ranches.

Nothing along the whole border is more chastely beautiful than the old Mission of San Xavier del Bac, just south of Tucson, on the Nogales highway. It is pure white, visible for miles across the desert, and is built in the form of a cross. It is really one of the great historic memorials of the United States. Nowadays the peaceful Pimas work their little farms and come devoutly to mass in this old church, where years ago other Pimas slew the priests and tried to destroy the building.

A short ride west of Nogales the due-west trend of the line is broken, and it veers northwest by west, straight to the Colorado River, striking that stream a few miles below Yuma.

This part of the boundary was first explored and run by one John Bartlett, after the Treaty of Guadalupe Hidalgo and the Gadsden Purchase. No section of the whole boundary line is so wild, dry, uninhabited, and little known as this which stretches from Sasabe to the Yuma desert. Only a few smugglers, Yaqui gun-runners, and the wary, tireless line-riders who hunt them really know much of this arid, empty waste.

A $600,000 SUBSIDY FOR A STAGE-COACH LINE

After this Gadsden Purchase survey, Congress in 1853 granted money for exploring a railway route from the Mississippi to California; but trains did not run till 31 years later. In 1857, however, mail and passenger stages were started, under a government subsidy of $600,000 a year. This line used 100 Concord stages, 1,000 horses, 500 mules, and about 150 drivers. The fare from St. Louis to San Francisco via this border route was $100. Official orders defined the border route in part as "from Preston, Texas, to the best point of crossing on the Rio Grande, and not far from Fort Fillmore; thence along the new road being opened and constructed, under the direction of the Secretary of the Interior, to Fort Yuma; thence through the best passes and along the best valleys for safe and expeditious staging to San Francisco."

But that part of the trail from Tubac, Arizona, to California was worn and old long before the lumbering Concord stages, making a hundred miles a day, began to use it.

Rafael Amador, an official courier with messages from Santa Ana to the Governor of California, rode from Mexico City to Monterey in some 40 days. Though stripped and robbed by the Yumas and nearly dead of thirst and hunger, yet he made it.

The coming of General Kearny, with his "Army of the West," to attack the Mexicans in California, in 1847, first mapped out this border trail and made it the main traveled route for the forty-niners. Fully 8,000 passed this way, many dying of thirst. Once in a while prospectors out of Yuma still come upon rusting parts of schooners or whitened bones of men and mules.

Kit Carson, too, made a memorable dash across this desert in '47, with a young army officer named Beale, carrying dispatches from the Fremont party to Washington. (This same Beale later introduced camels into the desert traffic. See footnote, page 65.)

Significant of changing things, scores

of well-to-do travelers now desert the comfortable Pullmans to motor along the borderland trails, following the old stage route past historic Tombstone and San Xavier. Most motor tourists, however, use the Santa Fe trail via the Petrified Forest, Flagstaff, and Needles. These motor trails are fairly well maintained and are amply marked with sign-boards as to direction, distances, and the proximity of water and gasoline.

BEEF IS EVERYWHERE

No feature of the trip along this border from El Paso to Nogales is more amazing than the vast numbers of meat-bearing animals to be observed.

Besides introducing the horse, the provident Spaniard also brought cattle, sheep, and goats; and it is probably to Juan de Onate, who reached the Southwest about 1598, that we owe our present wealth of mutton and beef.

As the country was settled, cattle-raising grew as an industry, and, there being no fences, the herder or cowboy was developed. From these Mexican or Spanish *vaqueros* we learned the use of the "rope," or *lariat*—corrupted from *La Riata*. From them, too, we learned to "cut" an animal from a herd, and to brand for identification.

However, due to Indian raids, it was years after Americans entered this region before the cattle industry was safe enough to be profitable.

After Kit Carson rounded up the Navajos at Bosque Redondo, and after Crook gave the Apaches a final walloping at Hell's Hip Pocket (near Fish Creek Hill, on the modern Apache motor road past Roosevelt Dam), the cowman's trade was easier. Then the rise of the cattle baron began. Might was law, and the sheepman and farmer were out of luck.

Of course, law and order long ago intervened, and the cow and sheep men no longer "draw" on sight and start shooting. But the cowpuncher still has his own opinion of any man who keeps a sheep!

Feuds between rival cow camps are no more; it is no longer good form to brand the other fellow's calves, even if you can "get away with it." Border cattlemen now have associations organized to secure better freight rates, protective laws, and coöperation in marketing cattle. Many cowmen run herds on both sides of the line.

But you can still tell a Texas cowman from his brother in Arizona. The Texas hat, saddle, cinch, bit—even the Texas talk and mental attitude—are quite different from the Arizona article.

At Yuma, where the Southern Pacific now bridges the Colorado, thousands of immigrants were ferried over in days gone by, and Yuma Indians once slew the ferryman and many other whites.

South of Yuma, for a short distance, the Colorado River forms the boundary between the United States and Mexico, the line here running almost north and south. Below the railroad bridge it quits the river, and strikes due west across the Imperial Valley Canal (running into Mexico here), and thence into the sand hills and on to the Imperial Valley.

No other part of the United States is so hot as this. Often the thermometer stands at more than a hundred at midnight; day shade temperatures of 125 Fahrenheit are common. Sahara-like sand-storms blow, so that even stretches of the plank auto road west of Yuma are soon lost in the dunes, and have to be excavated when the storm has passed.

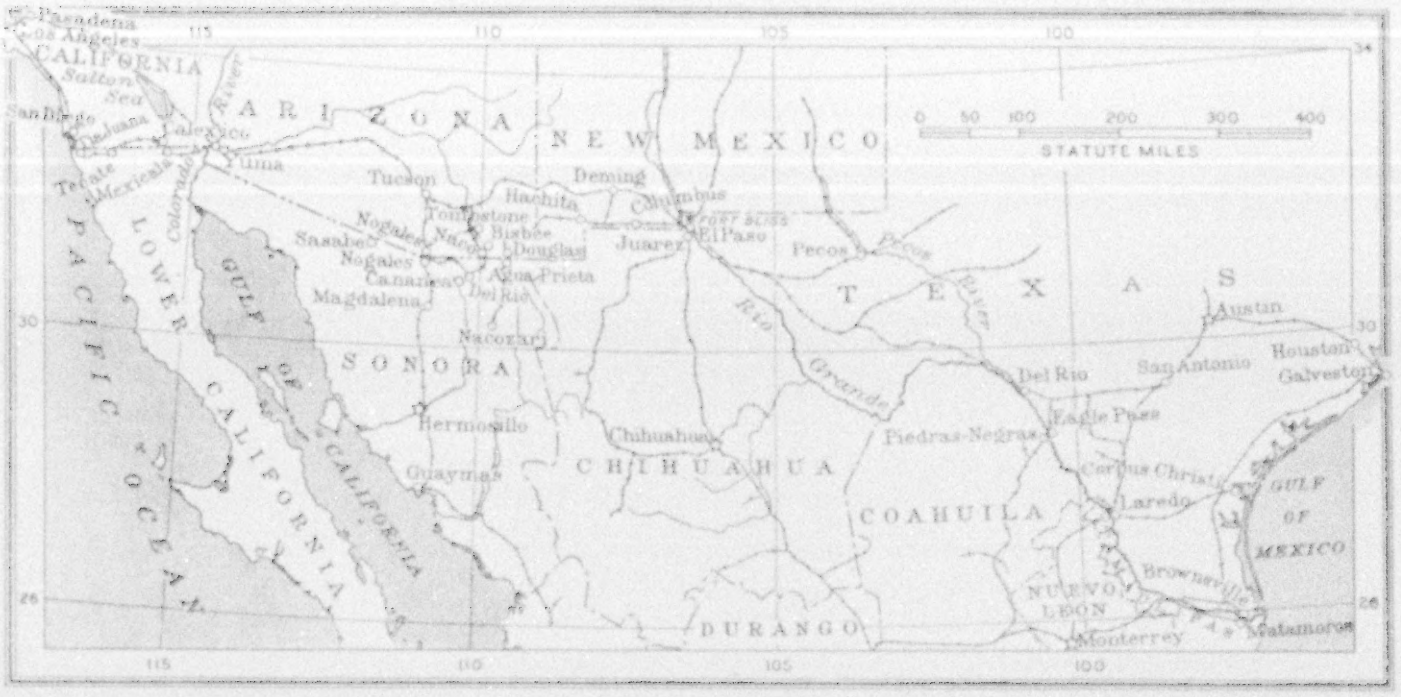
CATTLE SUFFOCATED BY SAND

A tale is told of one poor Arizona cowman who was driving his small herd to the California market. He had just completed the journey across the desert when night overtook his outfit. With it came a sand-storm. The cattle, lying down thirsty and jaded, were actually covered with the drifting sand, being too tired to stir and keep above it.

When dawn came the desert about was covered with mounds and dusty shapes, with here and there a pair of horns protruding. The cattle had suffocated.

Curiously enough, too, steamboats once ran from San Francisco to Arizona! During a period following our Civil War, steamers plied the California coast, came around the peninsula of Lower California into the Gulf, and thence up the Colorado River to Yuma. For many years the main bulk of supplies for the Arizona miners came in this way.

Above Yuma the government's great Laguna Dam project is built, and all about the city fertile farms are developed.



Drawn by A. H. Bumstead

A LONG, CROOKED LINE; THE HISTORIC UNITED STATES-MEXICO BOUNDARY

Some of the wildest and least-known regions of our country are piled up against this border. From the Gulf of Mexico up to El Paso, along the Texas frontier, the Rio Grande forms the boundary; thence to the Pacific coast the line is marked by monuments of stone and iron, so set that one is supposed to be visible from another.

Bird life abounds along the Yuma-to-Calexico section of the boundary, especially along the river delta. Here one may see ducks, geese, gulls, brown eagles, hawks, blue herons, *couriers del camino*, or "road-runners," elf owls, hummingbirds, and, among the mountains on the western edge of the Colorado desert, even occasionally that greatest of all American birds, the giant condor. When sitting erect these birds sometimes measure four feet in height.

A prize assortment of reptiles and insects is scattered along this border trail, much discussed by nervous newcomers who "camp out" for the first time.

Rattlers, side-winders, scorpions, centipedes, tarantulas, and the lazy, sluggish Gila monster (*Heloderma suspectum*), to say nothing of the flat, toad-like chuckwalla and a variety of other lizards, live a happy life. Then there are also the banded gekko lizard, the horned toad, and the desert tortoise. (In a lion's den on the Sonora side south of Ajo, I found a number of land tortoise shells, indicating that the lioness had brought these turtles in as food for her young.)

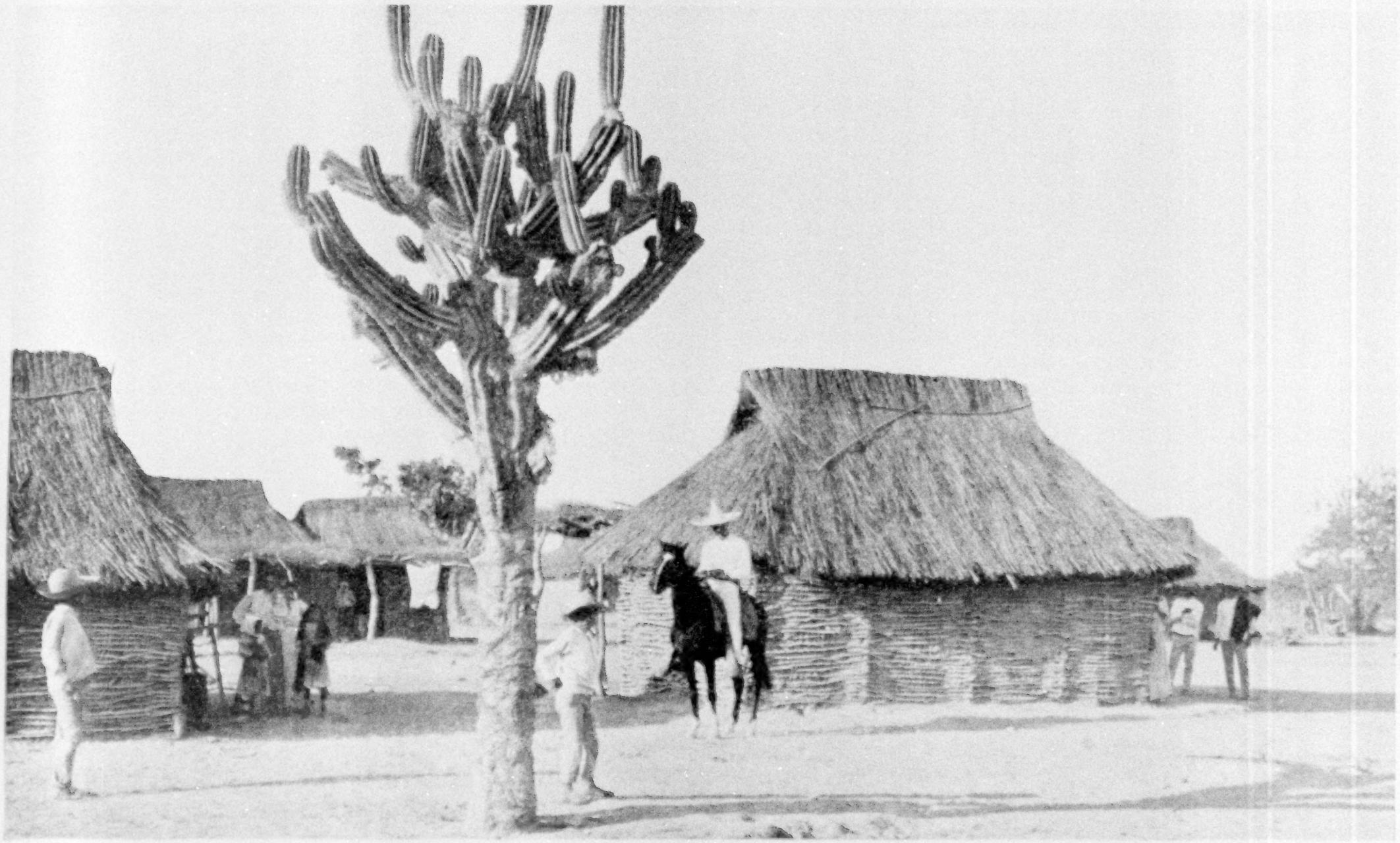
Along the New Mexico and Arizona borders occurs a distinctively interesting bird life. The big Texas "scale quail" has now walked as far west as Sasabe, on the Arizona line. A few years ago it was unknown in these parts.

In his "Distributional List of the Birds of Arizona," Harry S. Swarth gives a total of 362 species and subspecies. Many of these, however, are transients, being winter or summer visitors. In June and July the white-winged Sonora pigeon comes across the border by the tens of thousands. In small, almost dry "tanks," or Arizona ponds, I have shot the crooked bill curlew. Yes, shore-birds in Arizona!

In springtime the desert areas are bright with flowers. New Mexico and Arizona have an indigenous flora almost as large as California. A hundred members of the cactus family are in evidence, affording food to rabbits, gophers, field-rats, birds, beetles, and deer, as well as to cattle and burros. Were it not for their thorns, these plants would probably be utterly destroyed by these troops of hungry animals.

A DESERT LABORATORY ESTABLISHED

To aid farmers in getting better crops, a desert laboratory has been set up near Tucson, where a study of desert plant life is being carried on. Eventually, per-



Photograph by Harry A. Lawton

BENEATH THE INSUFFICIENT SHADE OF A CACTUS BIRD-ROOST

Woodpeckers have dug deep holes for nesting places in this cactus. When the first telegraph lines were run in the southern republic, these birds proved a destructive factor, necessitating the replacement of telegraph poles every year. The cactus in the illustration is one of many varieties which furnish the Mexicans with fruits, sweetmeats, furniture, paper, vinegar, and molasses.

haps, science will help the desert to furnish us with plants good for food and other purposes, even in areas where there is no water for irrigation.

Remnants of the low, filthy Cocopah tribe of Indians still inhabit the mud flats along the delta of the Colorado, catching fish, growing watermelons, or killing rabbits in the *tules* with clubs.

These Indians are most indifferent to whites, ignoring them utterly. Once I was in the vicinity of Volcano Lake when an aviator had been lost. Other planes came seeking the missing man, roaring and swooping over lagoons and mud flats. Cocopah Indians, loitering near, took only a casual glance at their first aëroplane and went indifferently about their simple tasks.

THE YUMA MEDICINE MAN IS LOSING HIS JOB

If you wander off the beaten trail, say down below the railroad bridge over the Colorado at Yuma, you may see a group of naked Yuma Indians sitting in the water up to their necks, their heads covered with mud to keep cool, "looking like a herd of seals," as one writer says.

Up near Banning, in the Coahuila settlement, they still have a medicine man, but he is about out of a job. Sugar-coated pills from the traders' stores and the free medicine the missionaries pass out appeal more and more.

Their houses are built of poles, arrow-weed, palm leaves, and willows. Granaries, too, looking like giant bird nests, are woven from willows and arrow-weed in dish-like shape. The basket-weavers, making designs of birds, turtles, and lizards, are dying out.

A few old tattooed Coahuilas are seen; they used to employ the mesquite thorn as a needle and rub the juice of mesquite leaves into the cuts, thus making a greenish tattoo design. They eat the chuckwalla lizard; also mesquite and screw-beans, first pounded fine into flour in a crude wooden mortar.

By far the most industrious, respectable Indians in these parts are the Pimas, of southern Arizona. On their reservation southwest of Tucson these people farm as successfully as the whites; their work animals are fat; their wagons are new or freshly painted, and their harness is in repair. With characteristic Indian reserve, they pretend to know no Spanish or English, but under compelling emergency many of them can converse in both languages.

Of our whole border, the California section is best known to Americans because of denser population, excellent motor trails, and proximity of cities like San Diego, Los Angeles, El Centro, and the below-the-sea border town of Calexico, opposite Mexicali. These Imperial Valley twin towns are really one city, split by the international line and each named by peculiar reverse arrangement of the first syllables of the words Mexico and California.

The incredibly fertile Imperial Valley of California sweeps north from Calexico to the Salton Sea, more than 200 feet below sea-level. The oft-told tale of this valley's fight against Colorado River floods and the eventual rise of a thriving community of 60,000 people, with farms worth maybe a hundred millions, is one of the romantic stories of this never-say-quit West.

From Calexico the line runs west past Signal Mountain, up the Jacumba Pass over the Lagunas, past the historic border town of Campo (once the stronghold of hellward gentry, now mostly fled, dead, or reformed), through the towns of Tecate and Tia Juana (famous for races and gambling casinos), and thence to the Pacific.

Motor highways parallel the line, one on each side of it, from Calexico-Mexicali to San Diego and Tia Juana. The road on the Mexican side was built by the Mexican Government as a military highway.

The San Diego and Arizona Railway enters Lower California (Mexico) at Tia Juana, rambles east through rocky canyons and cattle-covered, brushy hills for a few miles, and then reënters California at the town of Tecate by tunneling *under* the international line, thus literally forming an underground trail from Mexico into the United States. From here it runs east through Campo, over the mountains and down into the Imperial Valley.

Another road, the International Railway, enters Lower California at Mexicali, winds east some 60 miles or more

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PACK-ANIMALS LADEN WITH SUPPLIES FOR AMERICAN TROOPS STATIONED ALONG THE MEXICAN BORDER

The problem of transportation of military supplies along the border is especially difficult owing to the arid character of much of the country, where water as well as food has to be shipped by mule trains. There are still many stretches of country where the pack-animal is a more practical means of transportation than the motor-truck.

through a flat, productive cotton country, and then crosses back into California just west of the Colorado River, near Yuma, where it joins the Southern Pacific system.

Such is life along the Mexican border. All kinds of men live here, except poor white men. Few are vastly rich and few are dissatisfied with the country. Immigrants come, conquer the desert, and build comfortable homes. Few ever go back East. Something in the spell of the hazy mountains, the charm of bright skies, and the lure of open ranges holds them here.

And there is no leisure class; everybody *works*. I know one miner worth thirty millions. Last summer he sneaked off alone—dodging mail, telegrams, and directors' meetings—to work with his hands for a month, incognito, on the homestead where he'd lived as a boy.

UNCLE SAM'S WORK ON THE BORDER; WHO DOES IT, AND HOW

Uncle Sam's interests along the border are cared for by three branches of the government—the War, Treasury, and Labor Departments—working through the army, the customs, and the immigration services respectively. The State Department is also represented by consuls at the larger Mexican border towns of Matamoras, Laredo, Juarez, Nogales, and Mexicali; but they are concerned only with affairs on Mexican soil.

Since the Diaz régime passed into history, we have kept troops at all *our* border towns, with cavalry patrols between stations. These forces assist local civilian authorities in preserving order and checking the violation of our neutrality laws. They aid in preventing gun-running and the entry into Mexico of expeditions organized in the United States and bent on crossing the line and taking the field against the government of Mexico. About 20,000 of our men, of all arms, are now scattered along the border from Brownsville to San Diego.

The border is divided into three customs districts—the Texas, the New Mexico-Arizona, and the California—and the collectors are stationed at El Paso, Nogales, and Los Angeles. Deputy collectors are stationed at smaller towns, like Brownsville, Laredo, Columbus, Douglas, Naco, Yuma, Calexico, Tecate, etc.

The collectors have wide discretion. Besides the routine duties of their offices, they keep the Treasury Department informed as to economic conditions on the Mexican side of the line.

Then there are the "line riders," a group of mounted customs inspectors. They are a brave, hardy, and resolute class; they know and watch all the cattle trails and smugglers' passes through the remote border sections. Mostly bow-legged, saddle-born, southwesterners, frequently ex-rangers, these solitary men often spend a whole week in the open, sleeping, perhaps, on the ground in bad weather, on a still hunt for the equally capable smuggler.

Frequently enormously valuable cargoes of opium are landed on the Mexican west coast and finally spirited into the United States. A short time ago as much as eighty thousand dollars' worth of "canned hop" is known to have been landed and stored within 60 miles of the line. The profits in this trade are so huge, the tins of opium are so small and easily carried, that the traffic tempts many a crafty man to have a try at quick, easy money. Small-fry smugglers resort to such amateurish expedients as carrying opium over the line in bicycle tires, "trick" suit-cases, or in the tool-boxes of motor cars; but the daring gangs, who "run hop" on a big scale, usually work in armed bands, at night, taking a chance on dodging the line-rider or "shooting it out" with him.

THE MOST DIFFICULT BORDER TASK

Our immigration inspectors have the most difficult task on the border. They must meet, question, and make a record of every alien man, woman, or child that crosses the border. They collect certain head-taxes, and can refuse admission to certain classes (who may appeal).

Many aliens sneak into the country without inspection, crossing the border at lonely, remote points. Certain orientals are very clever at this, and there are known channels of illicit "underground" traffic. Many Chinese are smuggled in, negro porters on trains coming out of Mexico at one time doing a hustling trade. American smugglers have for

years engaged in running "yellow contraband" from the Mexican west coast, using speedy motor-boats and landing their hidden passengers as far north as Oakland. As much as $600 a head is sometimes collected on these smuggled immigrants.

BORDER TURMOIL HAS BROUGHT FORTUNES TO MANY

The ill winds that have wasted Mexico have enriched many residents of American border towns. Hundreds of wealthy Mexican families have removed to the border States, depositing their wealth in our banks and business industries.

Banks in certain Yankee border towns have paid as high as from 80 per cent to 200 per cent dividends. Sensational profits have been made on quick cattle deals and fluctuations in Mexican exchange.

Much money was made and lost, too, in the time of the *"billumbiques,"* or fiat money, issued by various factions during the early years of the Mexican revolution. Some of this paper money, originally supposed to be worth two for one (two pesos to one American dollar), finally fell in price until it was quoted at 50 for 1, 100 for 1, and even 1,000 for 1. A tale is told of a poor long-haired Indian at Agua Prieta who went crazy in a barber-shop trying to figure out how many *billumbiques* it would cost him to pay for a hair cut!

Mexican Government purchasing agents come in a constant stream to these frontier towns to buy supplies. They bring suit-cases of money and buy by the carload—buy not only animals, uniforms, provisions, motors, vehicles, harness, guns, ammunition, etc., but they also buy school supplies, machinery, tools, and furniture for use in various government-owned institutions.

In towns like Calexico, El Paso, and Nogales, certain shrewd Americans (mostly born in Poland and Syria), who were mere peddlers or "shoe-string" merchants ten years ago, now own handsome homes, send their children to fashionable schools in the East, and motor out to the California beaches each summer with their almost incredible, but highly delighted, wives.

Border brokers make cash advances to speculative traders, who go into Mexico and buy herds of cattle, cargoes of garbanzos and tomatoes, hides and ores. These imports become ready money, once they reach the American side of the line, and the handsome margin of profit stays in the border towns. No part of the United States has seen more prosperity in the last decade than some of these small border ports of entry.

Commission agents, customs brokers, import and export houses, and mining and plantation machinery agents thrive here. The regions of Arizona and New Mexico that crowd against the line are not in themselves particularly rich except in minerals; yet some firms here handle tremendous volumes of goods each year, most of which is sold in Mexico.

Nogales and Douglas have trebled their populations in the past decade, and thousands of Mexicans have moved across the line, increasing the already high percentage of Mexicans residing in our border States.

TO THE MEMBERS OF THE NATIONAL GEOGRAPHIC SOCIETY

THE BOARD OF TRUSTEES of the National Geographic Society calls attention to the increase in dues for all members elected after July 1, 1920. This increase has become necessary owing to unprecedented increases in everything pertaining to publication since January 1st; for example, of 50 per cent in the cost of printing, and of 88 per cent in the cost of the special quality of paper upon which THE GEOGRAPHIC is printed, and which cannot be cheapened without materially impairing the clarity and beauty of illustrations which have made your magazine unique in periodical literature. As noted on the Recommendation for Membership blank, the annual membership dues in the United States are now $3.00; annual membership abroad, $4.00; Canada, $3.50; life membership, $50.00.

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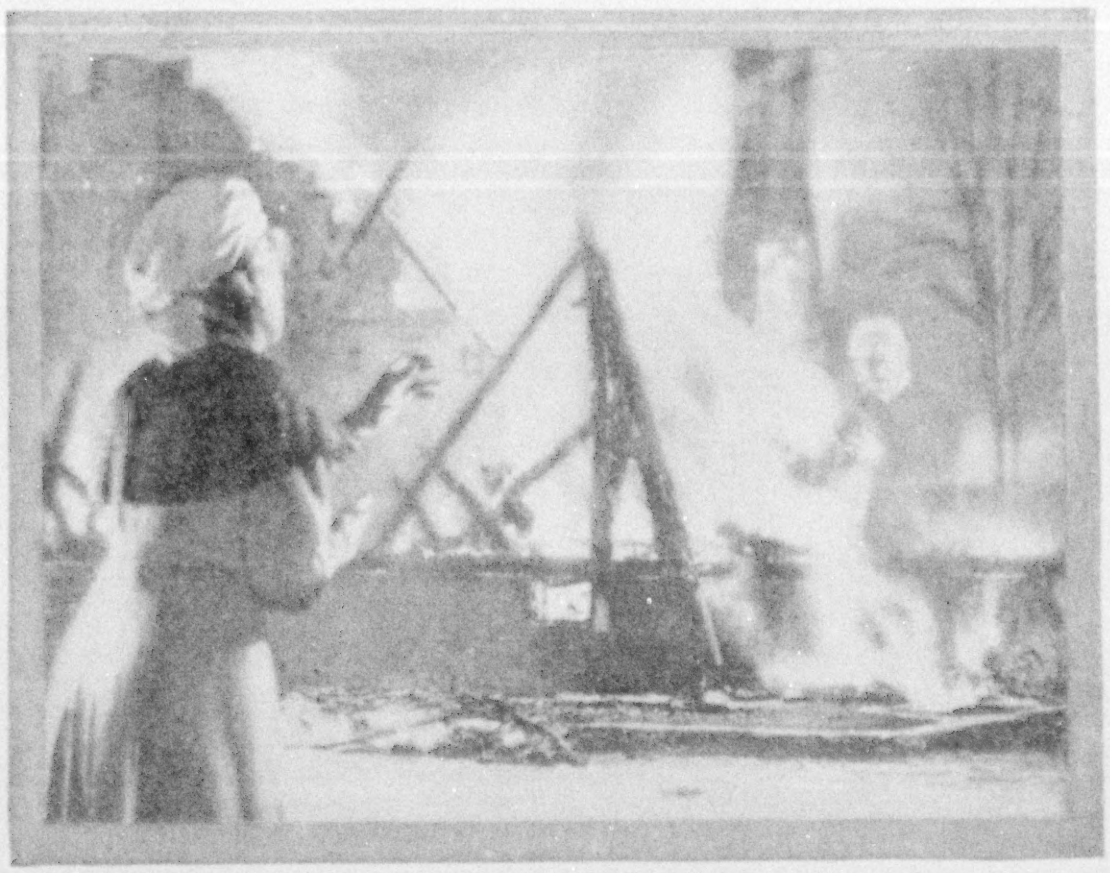

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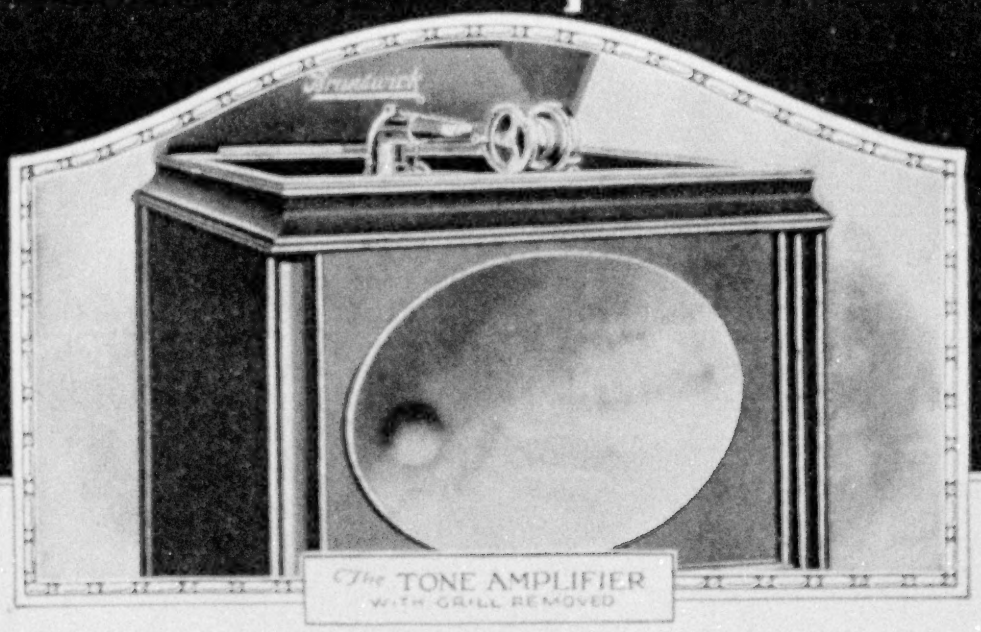

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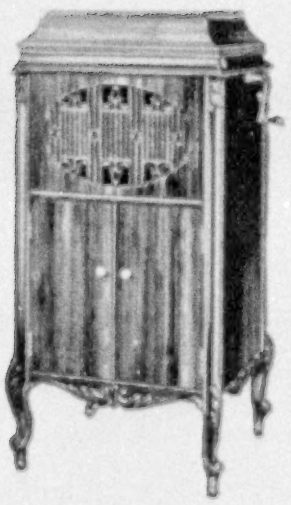

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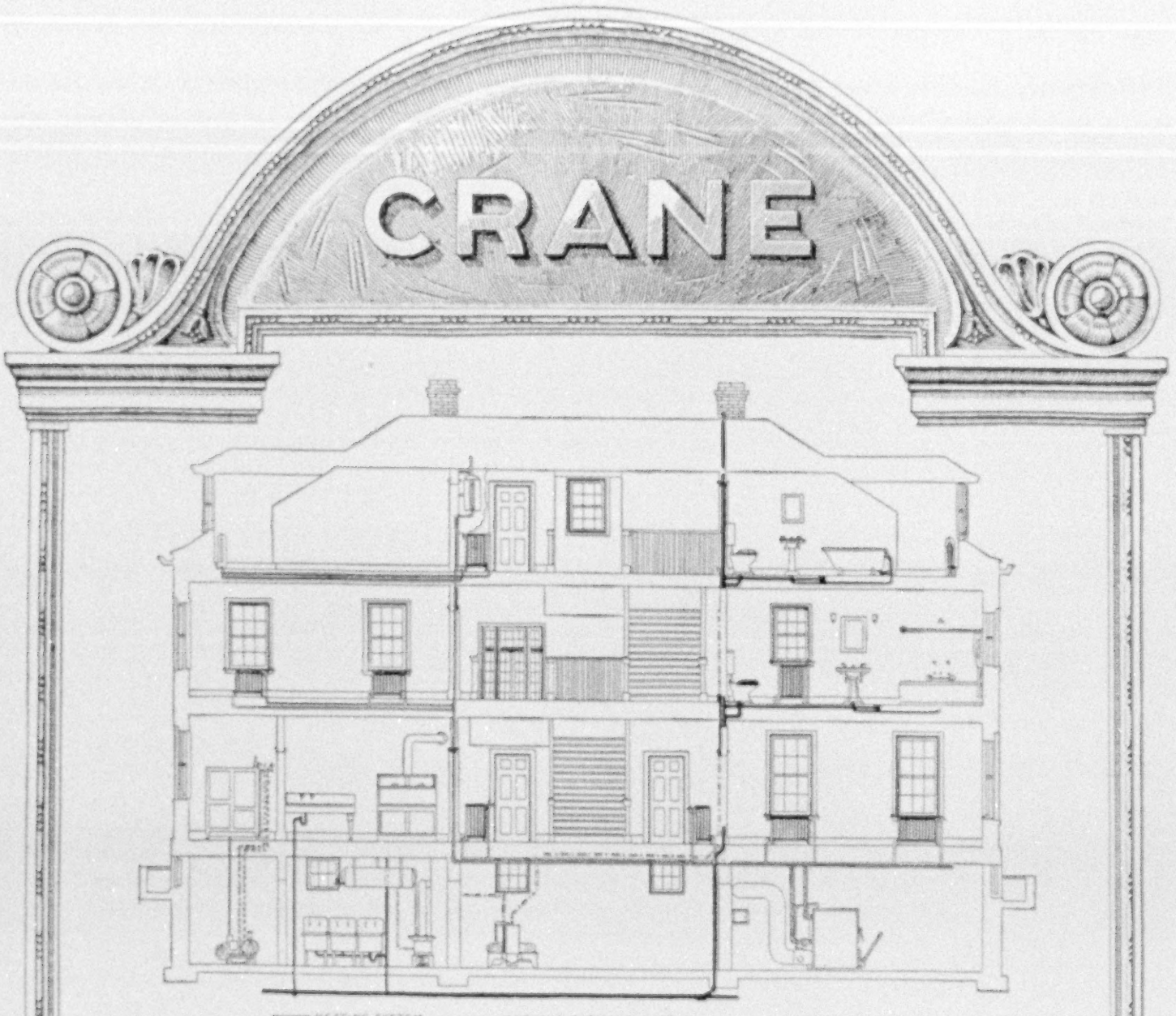

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For Shavaid does away with hot water applications, with rubbing the lather in. Men have clung to these old fashioned harsh methods because they have thought they were necessary. They are not. They are injurious to the tender skin.

Softens and Soothes

The soothing, cooling effect is noticeable as soon as you apply it to the dry beard. Then lather. Don't rub the lather in. The lather stays moist and creamy. And as you shave, note how the blade "takes hold" without pulling. That is because the beard is thoroughly softened, prepared as it should be.

No need of lotions or creams after a Shavaid shave. No injury has been done to the tender skin. There is no need for medicaments. On the contrary, your skin is smoother, firmer, healthier from Shavaid's healing influence.

Men who shave close find Shavaid wonderful. The burning, stinging sensation they used to feel after shaving is gone. They know real shaving comfort at last.

Shavaid

Softens the beard instantly
—apply to dry face before the lather.

Saves time and trouble
—no hot water, no "rubbing in" of the lather.

Protects the face
—skin remains firm and smooth.

Removes the razor "pull"
—harsh ways age the skin prematurely.

Replaces after-lotions
—Shavaid is a cooling, soothing balm.

It Is Worth Trying

All that is necessary, in order to introduce this remarkable new aid to shaving comfort, is to get men to try it—just once.

No man who shaves once with it will be without it again. For shaving, instead of an irksome task, becomes a positive pleasure.

You can get Shavaid from your druggist at 50c. a tube. If he hasn't it, we will be pleased to fill your order direct.

B&B

Shavaid

At Druggists—50c a Tube

BAUER & BLACK Chicago New York Toronto

Makers of Sterile Surgical Dressings and Allied Products

This 10-Day Test

Has shown millions the way to white teeth

All statements approved by high dental authorities

This is how millions have found the way to whiter, safer teeth. You see the results on every hand—perhaps in teeth you envy. Send now for this simple ten-day test and see what your own teeth show.

Why teeth discolor

There is on your teeth a viscous film. You can feel it with your tongue. It clings to teeth, enters crevices and stays. That film is the teeth's great enemy. It dims them and destroys them.

The tooth brush fails to end it, for the ordinary tooth paste cannot dissolve it. So for months between your dental cleanings it may do a ceaseless damage.

It is the film-coat that discolors, not the teeth. Film is the basis of tartar. It holds food substance which ferments and forms acid. It holds the acid in contact with the teeth to cause decay.

Millions of germs breed in it. They, with tartar, are the chief cause of pyorrhea — a trouble which few escape.

Dental science has for years sought a way to fight that film. Five years ago the way was found, and convincing tests have proved it. Now leading dentists everywhere advise it, and millions of people have been led to employ it.

The method is embodied in a dentifrice called Pepsodent — a tooth paste considered ideal by authorities. It is believed that its use will create a new dental era.

Supplied on request

A ten-day tube of Pepsodent is now sent to all who ask — to 10,000 people daily. This is done to let every one know quickly what it does.

Pepsodent is based on pepsin, the digestant of albumin. The film is albuminous matter. The object of Pepsodent is to dissolve it, then to day by day combat it.

Pepsin must be activated, and the usual agent is an acid harmful to the teeth. That is why it long seemed barred. But science has found a harmless activating method, so it can be daily applied to the film.

Two other new factors in tooth protection are also combined in Pepsodent.

Send the coupon for a 10-Day Tube. Note how clean the teeth feel after using. Mark the absence of the viscous film. See how teeth whiten as the film-coat disappears. A ten-day test will be a revelation.

Compare this new method with the old. Then let the clear results decide what is best for you and yours. Cut out the coupon now.

Pepsodent PAT. OFF. REG. U.S.

The New-Day Dentifrice

A scientific film combatant which, after 5 years' test, is now advised by leading dentists everywhere.

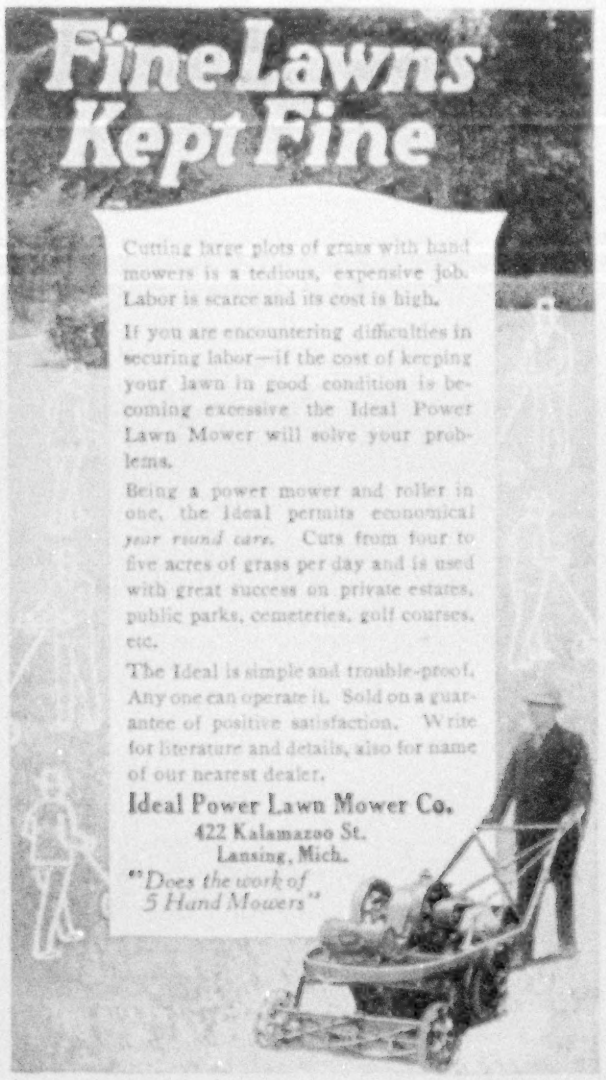
Druggists supply the large tubes.

Ten-Day tube free

THE PEPSODENT COMPANY,
Dept. 595, 1104 S. Wabash Ave., Chicago, Ill.:
Mail 10-Day Tube of Pepsodent to

Only one tube to a family

SOMETIMES you want additional speed in a hurry. There are times when you need it.
To pass the car ahead requires more power—speed.
Your car will get in the lead and stay there if it is equipped with the New Stromberg Carburetor.
The New Stromberg makes a quick pick-up positive. It means more power.
And it does it in the most economical way—consumes less gas per mile of travel.
Write for literature pertaining to Stromberg efficiency and economy. State name, year, and model of your machine.
Stromberg Motor Devices Co.
Dept. 739
64 E. 25th St.
CHICAGO, ILL.
New STROMBERG CARBURETOR Does it!


Fine Lawns Kept Fine
Cutting large plots of grass with hand mowers is a tedious, expensive job. Labor is scarce and its cost is high.
If you are encountering difficulties in securing labor—if the cost of keeping your lawn in good condition is becoming excessive the Ideal Power Lawn Mower will solve your problems.
Being a power mower and roller in one, the Ideal permits economical *year round care.* Cuts from four to five acres of grass per day and is used with great success on private estates, public parks, cemeteries, golf courses, etc.
The Ideal is simple and trouble-proof. Any one can operate it. Sold on a guarantee of positive satisfaction. Write for literature and details, also for name of our nearest dealer.
Ideal Power Lawn Mower Co.
422 Kalamazoo St.
Lansing, Mich.
"Does the work of 5 Hand Mowers"

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.....192

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington, D. C.:

I nominate .....

Address .....

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for membership in the Society

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7-20 *Name and Address of Nominating Member*

PAINTED FOR FATHER TIME BY HUGH RANKIN

ZERO HOUR in the Dark Ages!
The Time-Candle has burned to its seventh ring, the marauding Dane sleeps in his camp—*to arms*, ye warriors of Alfred the Great!

* * *

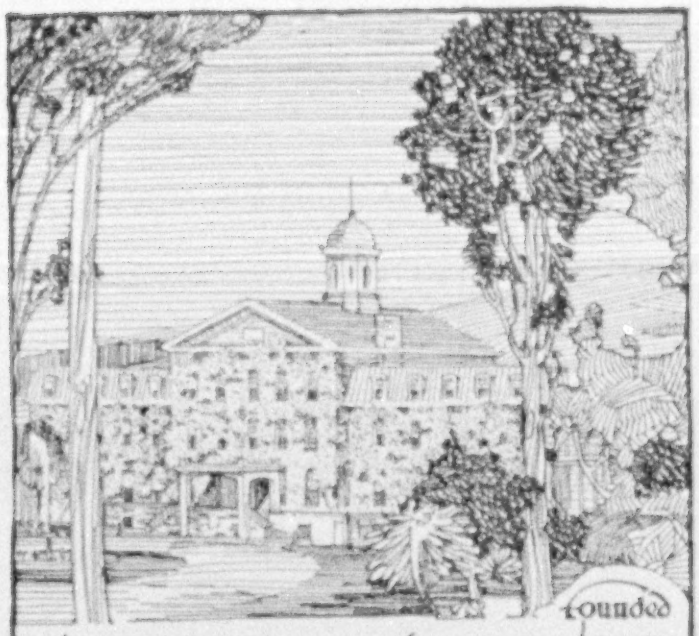
Inventions run in cycles. Alfred's Candle recalls the Cave-Man's timepiece. The grass rope was divided by knots, the candle by notches or rings.

King Alfred's grasp of *the value of Time* was amazing—his working schedule a challenge to modern executives.

To God he dedicated one-half of his most precious possession —*Time!* The Time-Candle, with its twenty-minute divisions was his shrewd device for more accurately fulfilling that vow—a thousand years before the timekeeping marvels of our day—

Elgin Watches

"Mention The Geographic—It identifies you"



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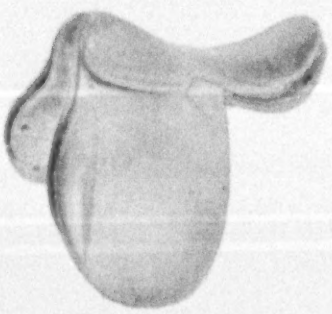
In old residential Hollidaysburg located in the most beautiful and healthful section of the Allegheny Mountains, six miles by electric and steam trains from Altoona on Main Line of Penna-Railroad

College preparatory, General and Post-Graduate Courses.

Address Miss Ellen C. Keates, A.B., Principal. Hollidaysburg Pa.



Leather Tree Spring Seat Saddle.

Every Whitman Saddle Bears the Silver Shield Trade-Mark.

Every saddle the hand-work of an artist

Every Whitman Saddle is made by hand—the work of craftsmen who enjoy the same inspiration and put into their work the same pride as does the artist who paints a picture.

And also, like the artist, each Campbell saddler stamps his name and the date of completion upon each saddle: it may be hidden from view, perhaps, but it is always there.

Whitman Saddles are made in 43 different styles—a saddle for every purpose and every individual.

You can view the entire line of Whitman Saddles, as well as a complete display of Whitman-Campbell Equestrian Products, at your local saddle shop, or at our two equestrian show-rooms:

89 Chambers St., New York City
1329 S. Michigan Ave., Chicago

The Perkins Campbell Company, Cincinnati

DeLuxe book of saddles loaned on request

TYR WOOL
REG. U.S. PAT. OFF.

Tyrol Wool is a knitted all-worsted fabric, finely finished, damp-proof, non-wrinkling, and has endless wear.

Suitable for all climates and outdoor occasions.

Price, $34.75

Ladies' and Misses' Plain Tailored Suits

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ALL COLORS

Several models

Catalogue and samples on request. Mail orders filled.

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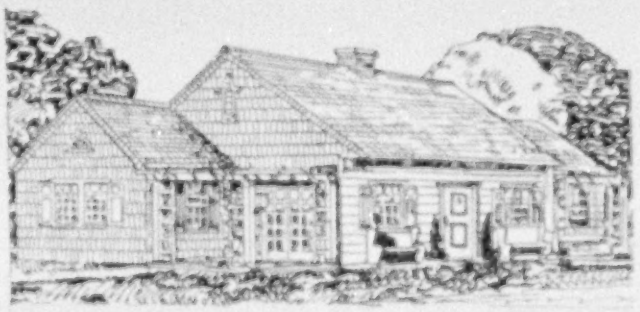


A Home You Will Be Proud To Own

Your house-hunting problems will be solved if you let Bossert build your home. If you are going to build in the old hand labor way, remember that labor and material costs are 300 per cent higher now than a few years ago and are constantly increasing. But by our methods we save you one-third. Besides that, you know before you spend a dollar what 75 per cent of the total cost of the house will be.

The other 25 per cent of your investment is for excavating, masonry, plumbing, wiring, and interior decorating, which can be done more economically locally.

Bossert Houses are more substantial than the average house built in the old hand labor way, and are shipped ready to erect. The many beautiful models offer a wide range of choice and minimize the chance of architectural duplication.

Send 18c. for illustrated and descriptive catalogue

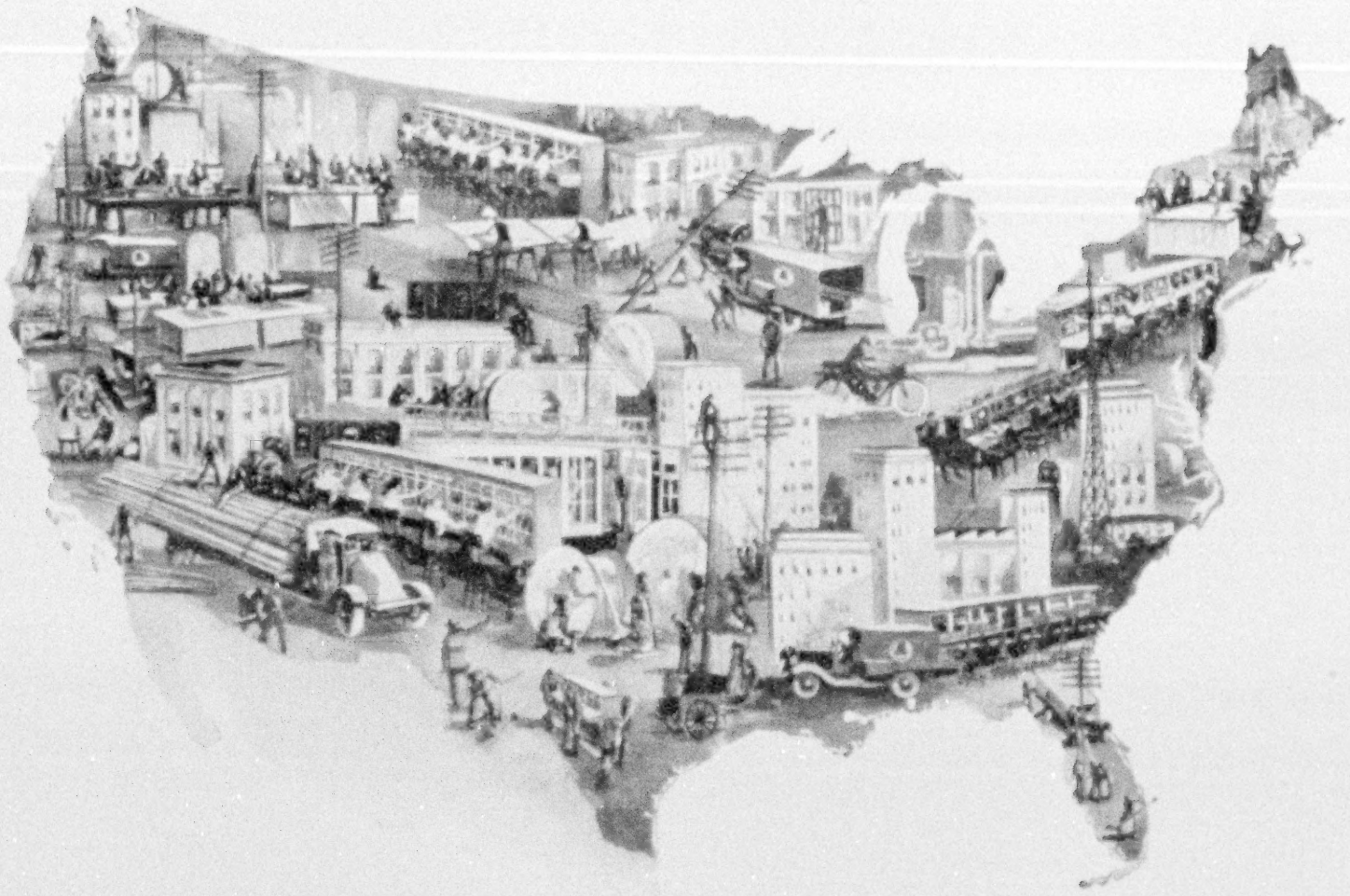
LOUIS BOSSERT & SONS, Inc.
1313 Grand Street Brooklyn, N. Y.

This is a Studebaker Year

The mechanical excellence of the SPECIAL-SIX, its power, riding comfort and economy—has made this car popular. Then, too, there's the charm of its graceful lines that have set new standards. These are factors that motorists appreciate.

50-H. P. detachable-head motor; intermediate transmission; 119-inch wheelbase, giving maximum comfort for five passengers. All Studebaker Cars are equipped with Cord Tires—another Studebaker precedent.

Studebaker



The laborer is worthy of his hire

All service is worthy of its hire and good service cannot be continuously obtained unless adequately rewarded.

From the beginning of telephone history the American public has received the best telephone service of any country in the world. In proportion to the service rendered the people have paid less for this telephone service than any other country in the world.

The reason why the American people have received the highest type of telephone service at the least proportionate cost is because the Bell System has been operated on a scientifically economic basis.

Every device which inventive skill, engineering ability, labor and time saving talent has been able to create; every efficiency known to buying, operation, executive control and financial conduct has been employed.

Public service companies feel the high cost of living as well as individuals. Pay them enough to make possible their giving good service. There is no permanent saving in poorly paid service.

In this land of opportunity none of us is willing to jeopardize his success or happiness by stinting the payment necessary to secure the most helpful and efficient service.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
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One Policy *One System* *Universal Service*

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ROCK OF AGES GRANITE

The judgment of those entrusted with the erection of a soldiers' memorial is forever attested or discredited by their selection of design and material.

That the verdict of the future on your discernment may be favorable, specify ROCK OF AGES GRANITE for the soldiers' cenotaph in your community.

ROCK OF AGES GRANITE, in all its dignified gray simplicity, is most suited to memorials for the American soldier. A certificate of genuineness is furnished.

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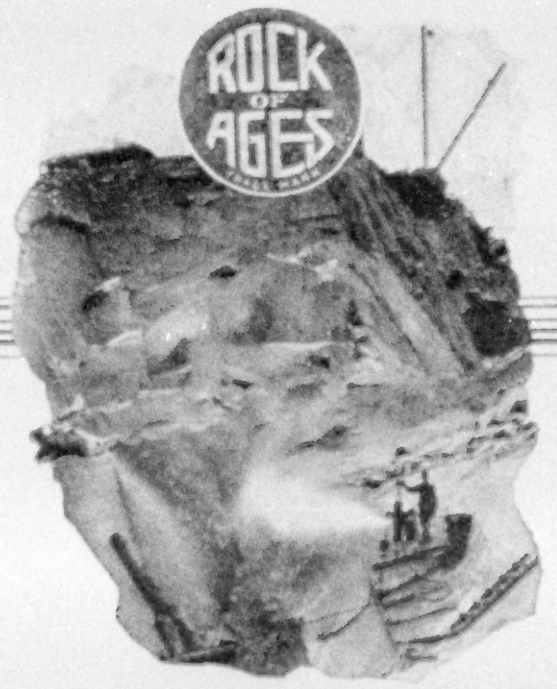

Quarries at
Barre, Vermont,
the Granite
Center of the
World

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A dangerous warning — bleeding gums

ARE your gums tender? Do they bleed when brushed? If so — watch out for Pyorrhea.

This disease of the gums, which afflicts four out of five people over forty, not only destroys the teeth, but often wrecks the health.

In Pyorrhea, the gums become spongy, then recede; the teeth decay, loosen and fall out — or must be extracted to rid the system of the infecting Pyorrhea germs which breed in pockets about them. These germs lower the body's vitality and cause many diseases.

You can keep Pyorrhea away. Visit your dentist often for tooth and gum inspection, and use Forhan's For the Gums.

Forhan's For the Gums prevents Pyorrhea — or checks its progress — if used in time and used consistently. Ordinary dentifrices cannot do this. Forhan's keeps the gums firm and healthy — the teeth white and clean.

Start using it today. If your gums have receded, use Forhan's according to directions, and consult a dentist immediately for special treatment.

35c and 60c tubes in U.S. and Canada

FORHAN CO.
New York

Forhan's, Ltd.
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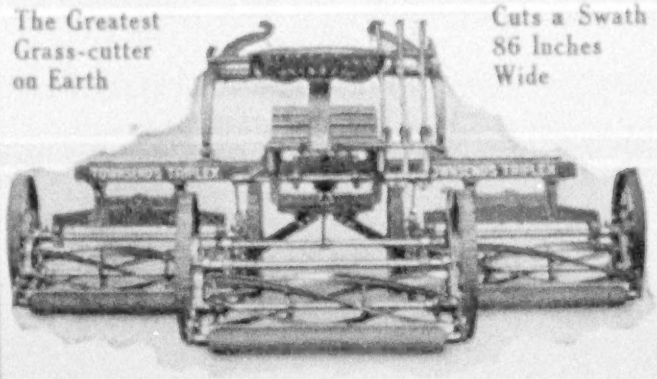
TOWNSEND'S TRIPLEX

The Greatest Grass-cutter on Earth

Cuts a Swath 86 Inches Wide



Floats Over the Uneven Ground as a Ship Rides the Waves

One mower may be climbing a knoll, the second skimming a level, and the third paring a hollow. Drawn by one horse and operated by one man, the TRIPLEX will mow more lawn in a day than the best motor mower ever made; cut it better and at a fraction of the cost.

Drawn by one horse and operated by one man, it will mow more lawn in a day than any three ordinary horse-drawn mowers with three horses and three men.

Does not smash the grass to earth and plaster it in the mud in springtime, neither does it crush the life out of the grass between hot rollers and hard, hot ground in summer, as does the motor mower.

The public is warned not to purchase mowers infringing the Townsend Patent, No. 1,209,519, December 19th, 1916.

Write for catalog illustrating all types of Lawn Mowers.

S. P. TOWNSEND & CO.
27 Central Avenue Orange, New Jersey

A Summer Home!

All song birds raise two, and usually three, broods of young each year, selecting a new nesting site for each brood of young, so if your houses are put out now they are sure to be occupied.

Dodson Houses

win the birds—built by a bird-lover who has spent a lifetime studying their habits and how to attract them to beautiful Bird Lodge, his home on the Kankakee River.

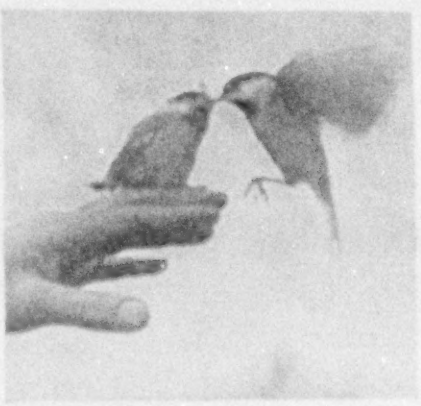
Price $6

Free Bird Book sent on request, illustrating Dodson Line, giving prices; also beautiful colored bird picture FREE.

Joseph H. Dodson, *President American Audubon Association*
702 Harrison Ave., Kankakee, Illinois

Dodson Sparrow Trap guaranteed to rid your community of these quarrelsome pests. Price $8.00.

FOR YOUR VACATION BAG



The Book of Birds

250 Bird Portraits in Full Colors

200 Pages of Charming Text

Enrich Your Summer Outing by Such Winged Friendships

Know the birds and understand their ways. This book by Henry W. Henshaw takes you into their homes and haunts. The color portraits by Louis Agassiz Fuertes enable even a child to identify these feathered neighbors. (*Circular on request.*)

Buckram or Khaki, postpaid in U. S., $3.00

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Washington, D. C.

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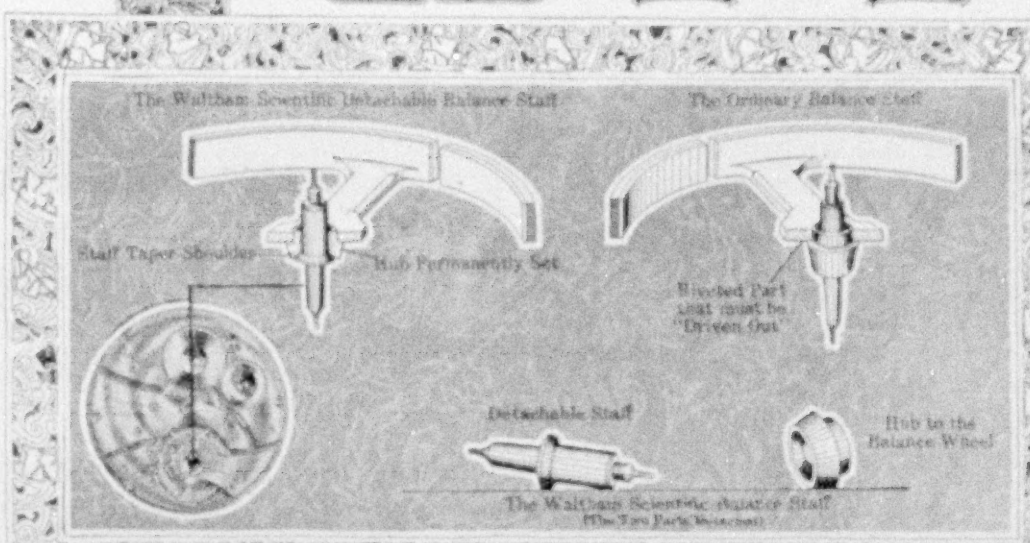

The Waltham Scientific Detachable Balance Staff
The Ordinary Balance Staff
Staff Taper Shoulder
Hub Permanently Set
Riveted Part must be "Driven Out"
Detachable Staff
Hub to the Balance Wheel
The Waltham Scientific Balance Staff
(The Two Parts Detached)

THE MOST SCIENTIFICALLY BUILT WATCH IN THE WORLD

The Waltham Scientific "Detachable Balance Staff" that Means So Much to You in Time-keeping Accuracy

THE time-keeping accuracy of any watch depends absolutely upon the trueness (in the flat and round) of the Balance Wheel.

This trueness depends largely upon the mechanical precision with which the Balance Staff is riveted to the Balance Wheel.

In other words, if the Balance Staff is not firmly and truly located in its hub, the balance becomes eccentric or wobbly in its action, which immediately affects the time-keeping quality of the watch.

How important, then, is this exclusive development of the Waltham Scientific Detachable Balance Staff. Herein Waltham disregards the ordinary method of making the Balance Staff act as both axle and hub to the wheel.

You will note in the illustrations above that Waltham makes the Staff in two pieces. One a perfectly ground steel hub which is riveted to the Balance Wheel and is an integral part thereof. The Staff (you will note) has an accurately ground tapered shoulder which permits of its being driven to its exact seat and located accurately to the ground steel hub.

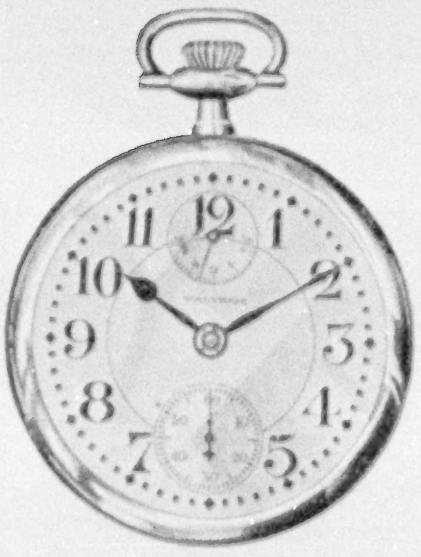
Any layman can understand that, if his watch is dropped or has a severe shock, the result will be a broken or bent Balance Staff, therefore requiring repairs in this important unit. Now a Staff which can be withdrawn easily from the hub without affecting the original, perfect assembly of the Balance Wheel assures him of continued accurate time-keeping and service from his watch.

On the other hand, when the ordinary Balance Staff is driven out of the Balance Arm for repair or replacement, the riveted part roughens and distorts the metal.

Therefore, the original aperture in the Balance Arm has been more or less destroyed, and when the new Staff is fitted, the watch repairer must rivet over enough of the metal to secure the Staff, which distorts the Balance Arm and throws the Balance Wheel out of true and poise.

The Waltham Scientific Balance Staff insures simplicity of repair and the original time-keeping quality of your watch.

This is yet another reason why your watch selection should be a Waltham.



The Vanguard

The World's Finest Railroad Watch
23 jewels

$79 and up

This story is continued in a beautiful booklet in which you will find a liberal watch education. Sent free upon request. Waltham Watch Company, Waltham, Mass.

WALTHAM

THE WORLD'S WATCH OVER TIME

EGYPTIAN

DEITIES

The Utmost in Cigarettes

Plain End or Cork Tip

People of culture and refinement invariably PREFER Deities to any other cigarette

30¢

Anargyros

Makers of the Highest Grade Turkish and Egyptian Cigarettes in the World

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Niagara to the Sea

Arriving at

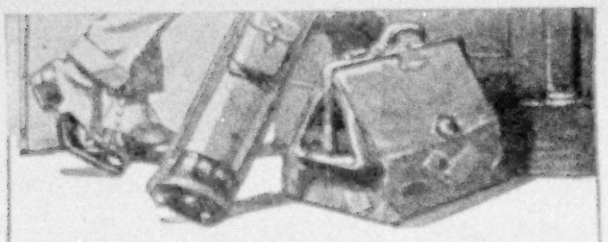
Historic Quebec

Every hour of this wonderful all-water journey has its revelation of beauty and historic interest—Niagara, the Sublime. Toronto—"The Queen City of Canada," the Venetian-like Thousand Islands, the thrilling descent of the marvelous rapids, the Canadian Metropolis Montreal, the miracle-working shrine of Ste. Anne de Beaupre—an hour from Quebec, the stupendous Capes "Trinity" and "Eternity"—higher than Gibraltar—are all on this route.

June is a glorious month on the St. Lawrence.

Send 2c. postage for illustrated booklet, map and guide, to John F. Pierce, Passenger Traffic Manager, Canada Steamship Lines, 107 C. S. L. Bldg., Montreal Canada.

CANADA STEAMSHIP LINES



When you travel

your baggage is exposed to innumerable hazards.

You insure these same effects while in your home where they are under your watchful care. Why not when you travel and they are subject to risks beyond your control?

Count up the value of your belongings. Figure it out. Can you afford not to

insure your baggage?

Think of the chances of loss from fire, theft, pilferage, etc., while it is in transit, in hotels, club-houses, and everywhere outside of your home! A NORTH AMERICA policy gives liberal protection and

costs but a few dollars a year

Write today for specimen policy or consult any North America agent.

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Insurance Company of North America

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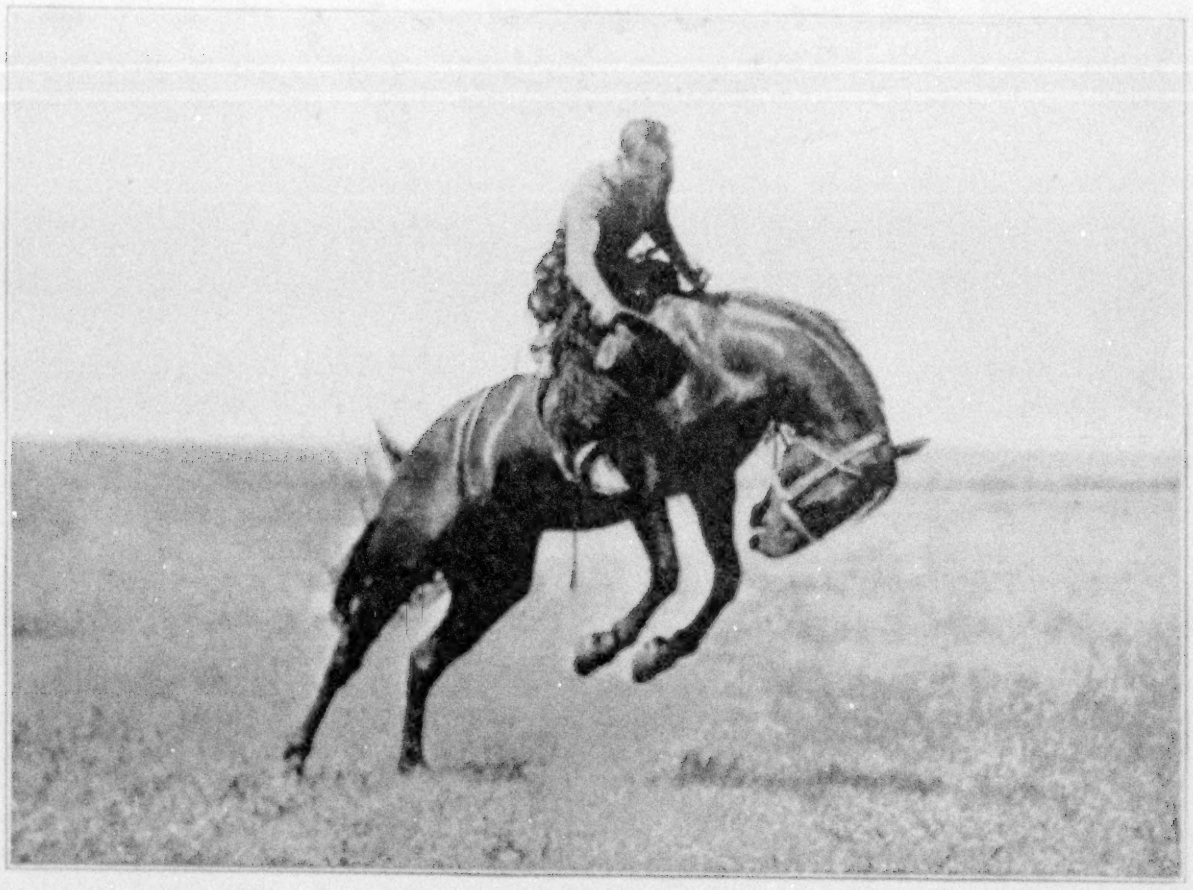
Any agent or broker can get you a North America policy



GRAFLEX

CAUGHT—and in every detail. One can almost hear the smashing, tearing effort of bone and sinew.

Graflex was not made for speed pictures alone. It is equally effective for making pictures of average subjects, with a certainty that is only possible the Graflex way—landscapes, marine views, birds and insect studies—fully timed negatives in light thought impossible for photography—pictures on cloudy or rainy days, indoor or outdoor portraits—through the whole gamut of subjects that have a trace of appeal.

Eastman Kodak Company

Folmer & Schwing Department Rochester, N. Y.

Catalogue free at your Dealer's or by mail.

Delightful Vacation Trips of Over 2000 Miles of Beautiful Scenery, Shore Line, Islands, Rivers, and Bays on the Big, New Cruising Ships

"North American" and "South American"

Cruises Weekly from Chicago, Duluth, Buffalo (Niagara Falls), Detroit, and Cleveland via Mackinac Island, Georgian Bay (30,000 Islands) and Return

Stops of several hours made at all principal points of interest—ample time to see the sights. The New Ships "North American" and "South American"—Passenger Service Exclusively—are equipped to give a service equal to the best Atlantic Liners. These magnificent steamships have many innovations for travel, comfort, and amusement—a ball-room, an orchestra, children's open-air playgrounds, and deck games. All these are free. Steamer chairs and steamer rugs available. Dining Service and Food Equal to that of the Best Hotels.

12 DAYS' CRUISE, $125—3,600 MILE TRIP

Call or write for pamphlet and full information about

THE LAKE TRIPS THAT HAVE NO EQUAL

Chicago, Duluth & Georgian Bay Transit Co.

W. H. BLACK, General Passenger Agent
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MASTER PRINTERS

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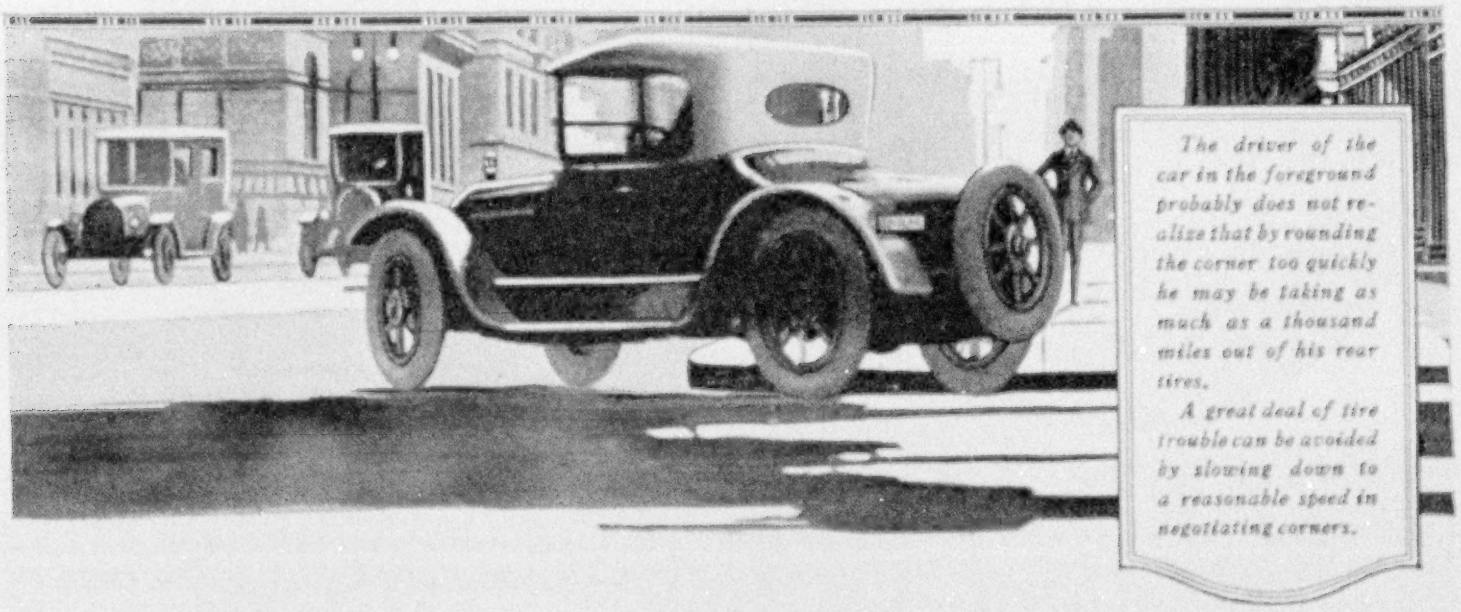
The MAGIC EARPHONE FOR THE DEAF *Makes Deaf People Happy*

A new and wonderfully effective aid to hearing. Smallest practical instrument made. Conveys voice tones in an agreeable tone. Has many new and important features found in no other instrument.

SPECIAL TRIAL OFFER. SEND FOR CIRCULAR No. 2

E. B. MEYROWITZ, INC. (ESTAB. 1875) 520 FIFTH AVENUE, NEW YORK

Five Million More Tires than last year
How much More Tire Economy



The driver of the car in the foreground probably does not realize that by rounding the corner too quickly he may be taking as much as a thousand miles out of his rear tires.

A great deal of tire trouble can be avoided by slowing down to a reasonable speed in negotiating corners.

IT IS interesting to watch a car owner gradually becoming conscious of his tires. If his first tires don't give him what he has been led to expect, you will see him going back to the dealer for an allowance.

Finally he reaches the point where he prefers to shoulder his losses himself rather than argue the matter out with the dealer.

Meet him a year later and you will probably find him with two or three different makes of tires on his car.

* * *

There is less conviction in the minds of motorists about tires today than about any other subject connected with motoring.

Despite all the claims, all the allowances, all the selling talks that are presented for the motorist's consideration, he goes along in his own way, seeking the tire that will give him the greatest economy.

Often you see him running foul of the irresponsible dealer.

But sooner or later he finds out that claims and allowances and selling talks can never take the place of performance.

* * *

More and more motorists are coming to realize that the only way to tire economy is through *better tires*. Avoiding the dealer whose idea of business is merely to fill the eye or to supply a market and going direct to the *merchant who deals in quality*.

Never has the United States Rubber Company's policy of *quality first* been more thoroughly justified or widely appreciated than it is today.

Discounting, as it does, every temptation to force production in favor of a highly specialized, wholly standardized product.

* * *

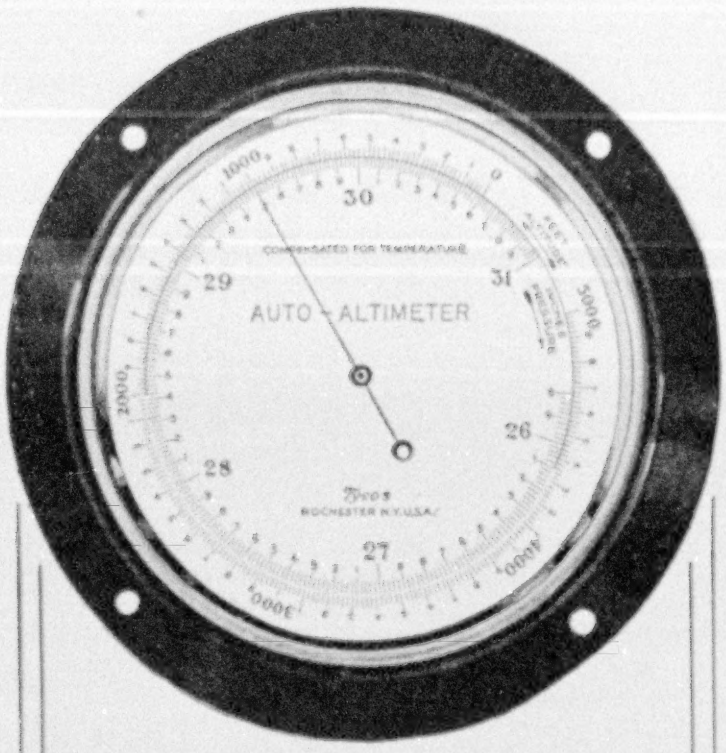
Even when the production of U. S. Tires has reached two or three times its present figure, the test will still be not how many tires—but *how good*.

United States Tires

United States Rubber Company

Fifty-three factories | *The oldest and largest Rubber Organization in the World* | *Two hundred and thirty-five Branches*

"Mention The Geographic—It identifies you"



A Refined Appointment

Possesses all the earmarks of highest utility; has made a definite place on distinctive cars driven by the intelligent motorists, who possess and take pride in the possession of the uncommon.

Tycos
Auto-Altimeter

Gives elevation when touring—fascinating interest; further gives weather indications. (All clearly set forth in booklet sent on request.)

This handsome instrument is cased in aluminum finished in permanent black, with silver-plated front, heavily beveled glass, and finely divided silver dial.

Furnished in either flush or offset style. Three types of dial; reading to 5,000 feet, $35; to 10,000 feet, $36.50; and to 16,000 feet, $39.

Those seeking to add a touch of refinement to their cars, to give the instrument board additional individuality, will find the *Tycos* Auto-Altimeter on demonstration at the better class of motor supply shops, optical stores, etc. The touring season is at hand. If dealer will not order for you (in case he is out of stock), remit direct to us, giving dealer's name. Make effort locally, please.

Taylor Instrument Companies
Rochester, N. Y.

There's a *Tycos* or *Taylor* Instrument for Every Purpose

Kills!

No Muss—No Mixing—No Spreading

Just a few nibbles at Rat Bis-Kit and then—rats and mice good-by! No trouble. Just crumble up. There's a different bait in each Bis-Kit. The pests die outdoors. Remember the name—Rat Bis-Kit. 25c and 35c at all drug and general stores.

The Rat Biscuit Co., Springfield, Ohio

Rat Bis-Kit

For Mice Too

Sani-Flush

TRADE MARK REG. U.S. PATENT OFFICE

Cleans Closet Bowls Without Scouring

Clean Your Closet Bowl the Easiest Way

SCRUBBING and scouring are no longer necessary to keep the closet bowl clean and white. Sani-Flush takes all the hard work off your hands. Follow the directions on the can; the rust stains, incrustations and markings in the bowl will promptly disappear and it will be left glistening white and absolutely odorless.

Sani-Flush is sold at grocery, drug, hardware, plumbing, and house-furnishing stores. If you cannot buy it locally at once, send us 25c in coin or stamps for a full-sized can postpaid. (Canadian price, 35c; foreign price, 50c.)

The Hygienic Products Co.
725 Walnut Ave., Canton, O.

Canadian Agents:
Harold F. Ritchie & Co., Ltd.
Toronto

Zinc

IN GOVERNMENT PAINTS

The various departments of the United States Government taken as a whole, buy and spread more paint than any other single consumer.

They go to every length in testing paint—on land, sea and in the air; from the Canal Zone to Alaska.

As a result, government specifications for paint, require Zinc Oxide in proportions which run as high as 55 per cent of the pigment.

The New Jersey Zinc Company manufactures Zinc Oxide of uniformly fine particles, uniformly white and of exceptional oil absorbing properties, qualities that contribute largely to the durability, covering power and color purity of paints.

Our command of ores, long years of experience, immense facilities and corps of skilled chemists and engineers all contribute to the production of a long line of high grade zinc products for all industries.

THE NEW JERSEY ZINC COMPANY, *160 Front Street*, New York
ESTABLISHED 1848

CHICAGO: Mineral Point Zinc Company, 1111 Marquette Building
PITTSBURGH: The New Jersey Zinc Co. (of Pa.), 1439 Oliver Building

Manufacturers of Zinc Oxide, Slab Zinc (Spelter), Spiegeleisen, Lithopone, Sulphuric Acid, Rolled Zinc Strips and Plates, Zinc Dust, Salt Cake and Zinc Chloride

The world's standard for Zinc products

New Jersey Zinc

THE FIRST cord tire made in America was a Goodrich.

Goodrich still makes the first cord tire in America—

The Silvertown Cord

Goodrich Tires

Best in the Long Run

The B. F. Goodrich Rubber Company, Akron, Ohio • Adjustment Basis: Silvertown Cords, 8000 Miles; Fabric Tires, 6000 Miles

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On Business or Pleasure the Traveler will find American Express Travelers Cheques the most acceptable form of International Currency in any part of the world.

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For use in Great Britain and France purchase Pounds Sterling and French Franc Travelers Cheques in denominations of 5 or 10 Pounds and 200 or 400 French Francs. Pay for them here in Dollars and protect yourself from exchange extortions. Present them in Great Britain or France and receive Pound for Pound and Franc for Franc less a nominal stamp tax.

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Canada, Alaska, Central and South America, the West Indies, and the Orient—carry American Express Dollar Travelers Cheques. In use for thirty years, these cheques are readily accepted in every country throughout the world.

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AMERICAN EXPRESS COMPANY

Press of Judd & Detweiler, Inc.
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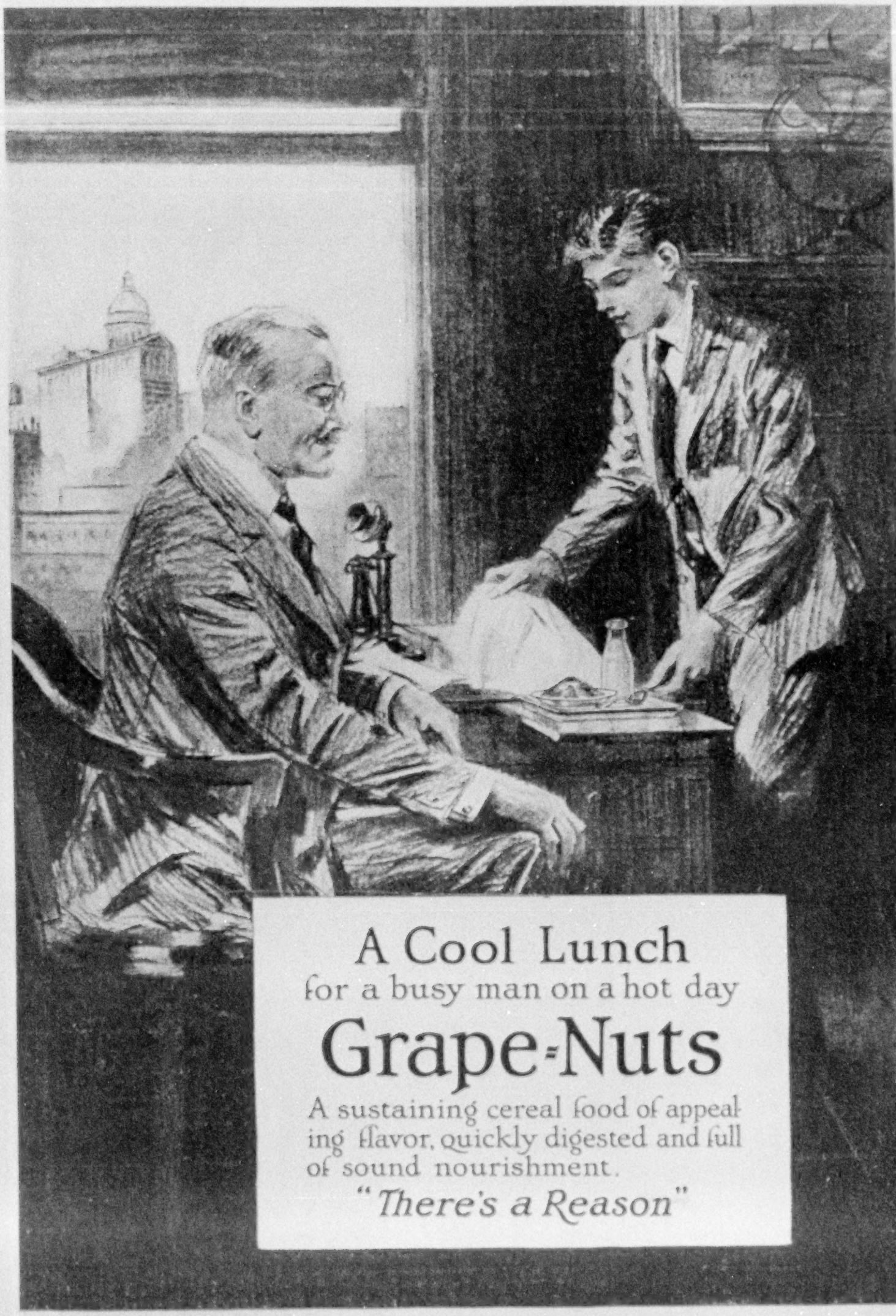

A Cool Lunch

for a busy man on a hot day

Grape-Nuts

A sustaining cereal food of appealing flavor, quickly digested and full of sound nourishment.

"There's a Reason"